WORK ORDER #GPC V-27

MIAMI-DADE METROPOLITAN PLANNING ORGANIZATION

COUNTERMEASURES FOR

Pedestrian and Bicycle

HIGH CRASH LOCATIONS

Executive Summary

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INTRODUCTION

Florida has been continuously ranked among the highest in terms of pedestrian and bicycle fatality rates in the United States. Miami-Dade County has had the highest number of pedestrian and bicycle crashes in Florida. Pedestrian fatalities accounted for 31 percent of Miami-Dade County's total fatal crashes in 2013, which is greater than the statewide average of 21 percent. Bicycle fatalities accounted for approximately five percent of the County's fatal crashes. Diverse factors contribute to the high pedestrian and bicycle crash rates in Miami-Dade County, including population growth, aggressive road users, year round warm weather that is conducive for walking and biking, tourists and visitors, a high percentage of elderly population, automobile oriented transportation infrastructure, and land planning and development patterns that resulted in suboptimal walking and biking conditions.

Given the magnitude of pedestrian and bicycle safety issues in Miami-Dade County, a sustained effort involving multiple stakeholders is needed to achieve measurable improvements. The Miami-Dade MPO's *Countermeasures for Pedestrian and Bicycle High Crash Locations Study* is another step of its continued effort to improve pedestrian and bicycle safety. The primary objectives of this study include the identification of locations with a high incidence of pedestrian and bicycle crashes and development of engineering and non-engineering countermeasures. Another objective is to develop an on-going process for annual crash data review.

PEDESTRIAN CRASH DATA ANALYSIS

The countywide pedestrian and bicycle crash data for the six-year period between 2008 and 2013 was evaluated to identify crash patterns and high crash locations. During the analysis period, there were 7,028 pedestrian crashes, including 388 fatal crashes. Overall, one in 18 pedestrian crashes resulted in a fatality. Key results of pedestrian crash data analysis are summarized below.

Lighting Condition:

- Sixty two percent of pedestrian crashes occurred during daylight conditions. However, 72 percent of fatal pedestrian crashes occurred during dark conditions.
- The proportion of fatal pedestrian crashes (i.e., fatal crashes/total crashes) under dark (lighted) conditions was four times greater than under daylight conditions.
- The proportion of fatal pedestrian crashes under dark (unlit) conditions was six times greater than under daylight conditions.

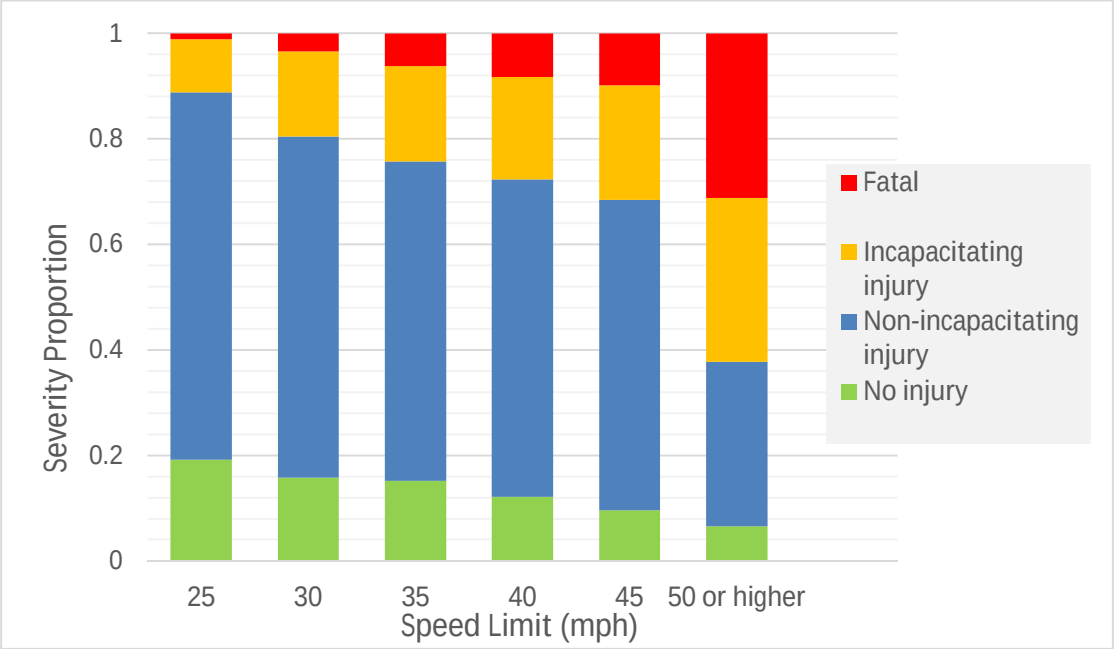
Crash Location:

- The ratio of fatal pedestrian crashes at mid-block locations was twice greater than at intersections.

Speed Limit:

- The ratio of fatal pedestrian crashes on 45 mph roads was three times greater than on 30 mph roads.

Figure ES1: Pedestrian Crash Severity by Posted Speed



Impairment (alcohol/drug users):

- Twenty percent of pedestrian crashes resulted in a fatality when the driver or pedestrian was impaired vs. five percent fatality proportion when no impairment.
- Miami had the highest number of crashes involving impaired road users, followed by Miami Beach and Homestead.

Juvenile Pedestrians:

- Sixteen percent of pedestrian crashes involved juvenile pedestrians.
- Six percent of fatal pedestrian crashes involved juvenile pedestrians.
- A decreasing trend in crashes involving juvenile pedestrians was observed.

Elderly Pedestrians:

- Sixteen percent of pedestrian crashes involved elderly pedestrians.
- Thirty four percent of fatal pedestrian crashes involved elderly pedestrians.
- One in nine crashes involving elderly pedestrians were fatal, which is twice greater than the overall fatal pedestrian crash ratio.

Vehicle Movement:

- Ten percent of pedestrian crashes involved a vehicle turning right.
- Fourteen percent of pedestrian crashes involved a vehicle turning left.

State Roads:

- Fifty one percent of total pedestrian crashes and 66 percent of fatal pedestrian crashes occurred on state roads.
- SR 968 (Flagler Street) had the highest number of pedestrian crashes per mile.
- SR 934 (NW 74 Street/NW/NE 79 Street) had the highest number of fatal pedestrian crashes per mile.

Non-State Roads:

- Forty nine percent of total pedestrian crashes and 34 percent of fatal pedestrian crashes occurred on non-state roads.
- Washington Avenue had the highest number of pedestrian crashes.
- NW 7 Street had the highest number of fatal pedestrian crashes.

Municipalities:

- Total crashes – Miami (30 percent), Miami Beach (10 percent), and Hialeah (8 percent); unincorporated areas of Miami-Dade (30 percent)
- Fatal crashes – Miami (27 percent), Hialeah (8 percent), Miami Gardens (5 percent), and Miami Beach (5 percent); unincorporated areas of Miami-Dade (40 percent)

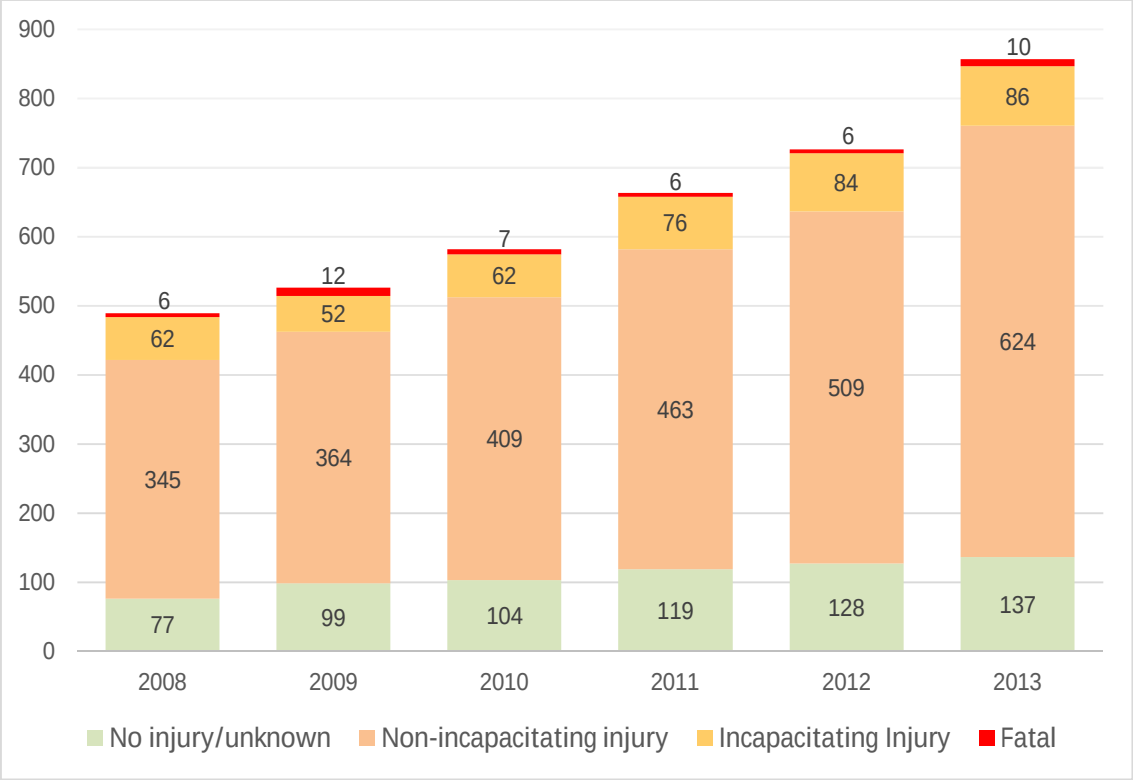
BICYCLE CRASH DATA ANALYSIS

Between 2008 and 2013 there were 3,854 bicycle crashes, including 47 fatal crashes. Overall, one in 82 bicycle crashes resulted in a fatality. The number of bicycle crashes increased by 74 percent between 2008 and 2013. There was no discernable change in the number of fatal crashes during the same period. Key results of bicycle crash data analysis are summarized below.

Lighting Condition:

- Seventy five percent of bicycle crashes occurred during daylight conditions. However, 73 percent of fatal bicycle crashes occurred during dark conditions.
- The proportion of fatal bicycle crashes (i.e., fatal crashes/total crashes) under dark (lighted) conditions was six times greater than under daylight conditions.
- The proportion of fatal bicycle crashes under dark (unlit) conditions was 21 times greater than under daylight conditions.

Figure ES2: Bicycle Crashes by Year (2008-2013)



Crash Location:

- The proportion of fatal bicycle crashes at mid-block locations was twice greater than at intersections.

Speed Limit:

- The proportion of fatal bicycle crashes on 45 mph roads was five times greater than on 30 mph roads.

Age of Bicyclists:

- Twenty one percent of injury crashes involved the 15-24 year age group.
- Thirty eight percent of fatal crashes involved the 40-54 year age group.

Vehicle Movement:

- Twenty three percent of bicycle crashes involved a vehicle turning right.
- Eleven percent of bicycle crashes involved a vehicle turning left.

State Roads:

- Forty five percent of bicycle crashes and 34 percent of fatal bicycle crashes occurred on state roads.
- SR 907 (Alton Road) and SR A1A had the highest number of bicycle crashes per mile.

Non-State Roads:

- Fifty five percent of bicycle crashes and 66 percent of fatal bicycle crashes occurred on non-state roads.
- Crandon Boulevard and Washington Avenue had the highest number of bicycle crashes.

Municipalities:

- Total crashes – Miami (22 percent), Miami Beach (14 percent), and Hialeah (6 percent); unincorporated areas of Miami-Dade (32 percent)
- Fatal crashes – Miami (17 percent); unincorporated areas of Miami-Dade (57 percent)

EVALUATION OF HIGH CRASH LOCATIONS

A total of 16 high crash intersections and roadway segments were selected for field reviews. These locations were selected using GIS crash density maps. The recommendations, which include both engineering and education strategies, are summarized in Tables ES1 and ES2.

Crandon Boulevard at Key Colony in Key Biscayne

Table ES1. Summary of Recommendations – High Pedestrian Crash Locations

Location	Pedestrian signal upgrades	Pedestrian signal timing	Street lighting	Mid-block crosswalks	Complete street concepts	ADA facility upgrades	Signs and markings	Bus stop relocation	Drainage improvements	Education
SW 27 Avenue at SW 6/7/8 Street	x					x	x			
NE 6 Avenue at NE 149 Street/NE 150 Street				x	x		x		x	x
NW 22 Avenue at NW 36 Street	x						x			
NW 62 Street from NW 13 Court to NW 12 Avenue	x	x	x			x	x		x	x
Kendall Drive at SW 157 Avenue			x			x	x			
SW 137 Avenue at SW 152 Street	x	x	x				x			
SW 137 Avenue at SW 268 Street/Moody Drive	x	x	x			x	x			x
W 24 Avenue at W 60 Street (Hialeah)						x	x			x
W 12 Avenue at W 37 Street (Hialeah)	x					x	x	x		
W 16 Avenue at W 44 Place (Hialeah)	x					x			x	

Table ES2. Summary of Recommendations – High Bicycle Crash Locations

Location	Green bike lanes in conflict areas	Complete street concepts	Bicycles share the road signs	Bike/pedestrian warning signs on driveways	New bike lanes	State law - 3-foot clearance sign	Other signs	Street lighting	Education/Enforcement	Landscape maintenance
Crandon Blvd between Harbor Drive and Seaview Drive	x			x		x	x			
SR A1A/Collins Avenue between Bayview Drive and 174 Street			x	x			x			
W 29 Street between Palm Avenue and W 16 Avenue/Milam Diary Road		x			x	x	x		x	
SR 976/SW 40 Street/Bird Road at SR 973/SW 87 Avenue			x							x
SW 112 Avenue between Old Cutler Road and US 1					x		x			
SW 312 Street/Campbell Drive between SW 177 Avenue and NE 1 Road*			x				x	x	x	x

* Evaluated for bicycle and pedestrian safety improvement needs

PROCESS DEVELOPMENT

A sustained effort is essential to achieving significant improvements in pedestrian and bicycle safety. The following process is recommended for the on-going analysis of crash data, evaluation of countermeasures, and coordination with responsible agencies.

Crash Data Analysis
Update the analysis of pedestrian and bicycle high-crash location every three years. Use annual data updates to monitor implementation of countermeasures and track crash patterns by geographic area, age-group, or crash type.

Guidance and Coordination
Create a Community Traffic Safety Team (CTST) devoted to pedestrian and bicycle safety. The CTST process brings together state and local planning, engineering, law enforcement and educational agencies to identify problems and develop multi-disciplinary solutions. A Pedestrian-Bicycle CTST would be the coordinating body for future non-motorized safety planning studies and could meet periodically to review crash data, share knowledge, and coordinate implementation efforts.

SUMMARY

This study is another step of the MPO's continued effort to improve pedestrian and bicycle safety in Miami-Dade County. Pedestrians and cyclists accounted for over 35 percent of fatal crashes in the county. After years of decline, the trends of crashes involving pedestrians and bicyclists are rising. The study identified high crash locations, causal factors for pedestrian and bicycle crashes, potential engineering and educational countermeasures, and a process for on-going review of crash data.

Vehicular speeds, mid-block crashes, dark conditions, elderly pedestrians, and impairment were identified as notable causal factors for fatal crashes. The need for engineering and educational strategies as well as increased coordination among stakeholder agencies was identified to achieve sustainable safety improvements. Enhanced street lighting in high pedestrian activity locations, mid-block crossings with appropriate control measures, countdown signals and enhanced signage at intersections, median refuge islands, green colored bike lanes in conflict areas, and maintenance of landscaping at driveways are few recommended engineering solutions. Educational campaigns to increase motorist, pedestrian and cyclist awareness of safe behaviors related to crossing the street, speeding, yielding at crosswalks, safe passing of cyclists, and using caution after dark. Coordination with transit agencies to use advertising space for traffic safety messages and in-vehicle alerts to remind alighting passengers to use crosswalks, as well as safety educational efforts targeting elderly pedestrians through the "Golden Passport" program should be considered. Furthermore, current safety awareness programs such as "Safe Steps" and WalkSafe/BikeSafe should be further expanded.