

CITY OF JOPLIN PEDESTRIAN SAFETY

August 21st, 2023

PEDESTRIAN
Joplin, MO
SAFETY

CJW



PEDESTRIAN SAFETY IS A SHARED RESPONSIBLITY

PEDESTRIAN SAFETY



INTRODUCTION

The City of Joplin has a vested interest in enhancing the safety for all users of the transportation system. As is the case with many communities across the United States there has been an increase in traffic crashes involving pedestrians and cyclists, also known as vulnerable roadway users. The city has taken a comprehensive review of pedestrian safety and through careful examination, and with a third party review, developed actionable steps to be implemented in order to improve pedestrian safety.

The city of Joplin has retained the services of CJW Transportation Consultants, LLC for traffic engineering and transportation planning services to review pedestrian safety issues in the City and recommend enhancements for improving safety for all roadway users, but more specifically for vulnerable roadway users. CJW reviewed multiple years of traffic crash data to guide what actions the city should take to improve pedestrian safety.

Some of the findings show that arterial roadways with higher volumes, and speeds present a heightened risk. Additionally, certain intersections showed a propensity for vehicular and pedestrian conflicts, illustrating the need to utilize designated pedestrian areas, so that all roadway users are where they are expected to be.

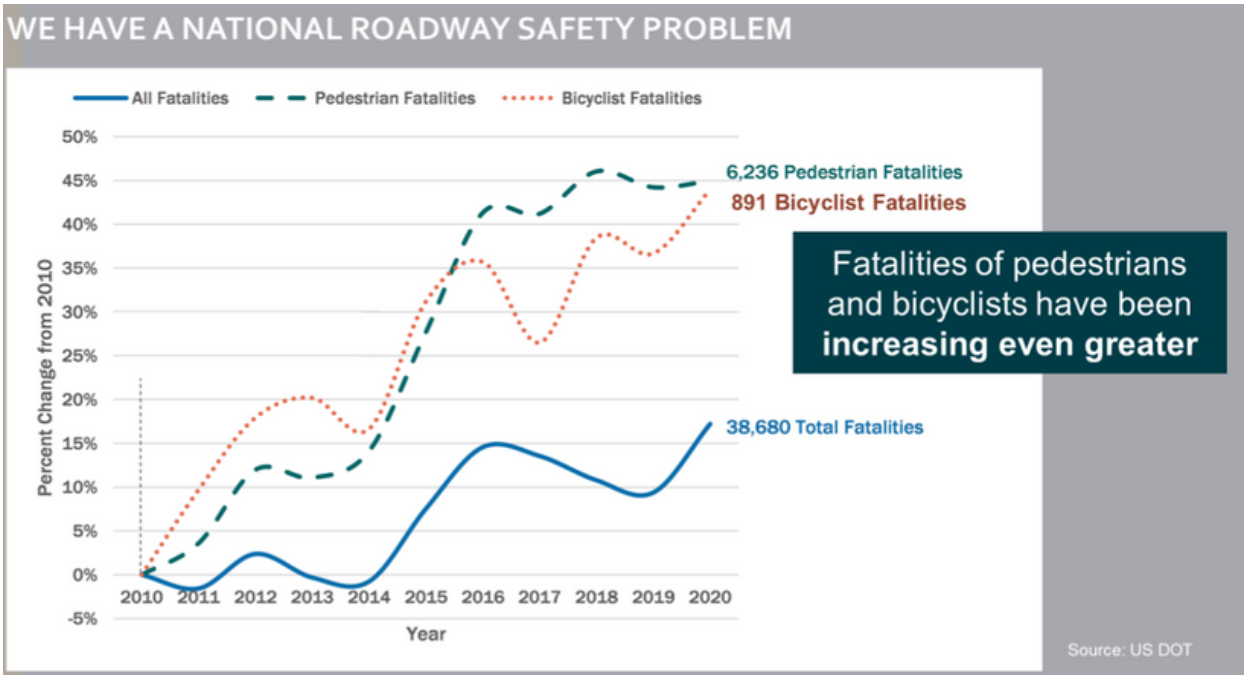
US Pedestrian Safety

Pedestrian safety is a significant concern in the United States, and around the world. The following information is a snapshot over time that shows pedestrian safety is an important element that communities and government agencies need to work to reverse current trends.

National Pedestrian Safety Numbers

In 2020 there were 6,516 pedestrians killed in traffic crashes in the United States. That is 18 pedestrians a day and 125 pedestrians a week. On average, a pedestrian was killed every 81 minutes in a traffic crash. The 6,516 pedestrian fatalities in 2020 represented a 3.9-percent increase from 6,272 pedestrian fatalities in 2019. This increase in pedestrian fatalities was smaller than the 6.8-percent increase in overall traffic fatalities from 2019 to 2020. Seventeen percent of all traffic fatalities in 2020 were pedestrians. In 2020 there were an estimated 54,769 pedestrians injured, a statistically significant 28-percent decrease from 75,650 pedestrians injured in 2019. Pedestrians injured made up 2 percent of the total people injured in crashes in 2020.

The figure below shows the drastic increase in pedestrian fatalities since 2010, where there where 4,280 pedestrian fatalities, compared to 2020 where there were 6,516 pedestrian fatalities. A 52%-percent increase in pedestrian fatalities in a 10-year period.



Missouri Pedestrian Safety Numbers

44%

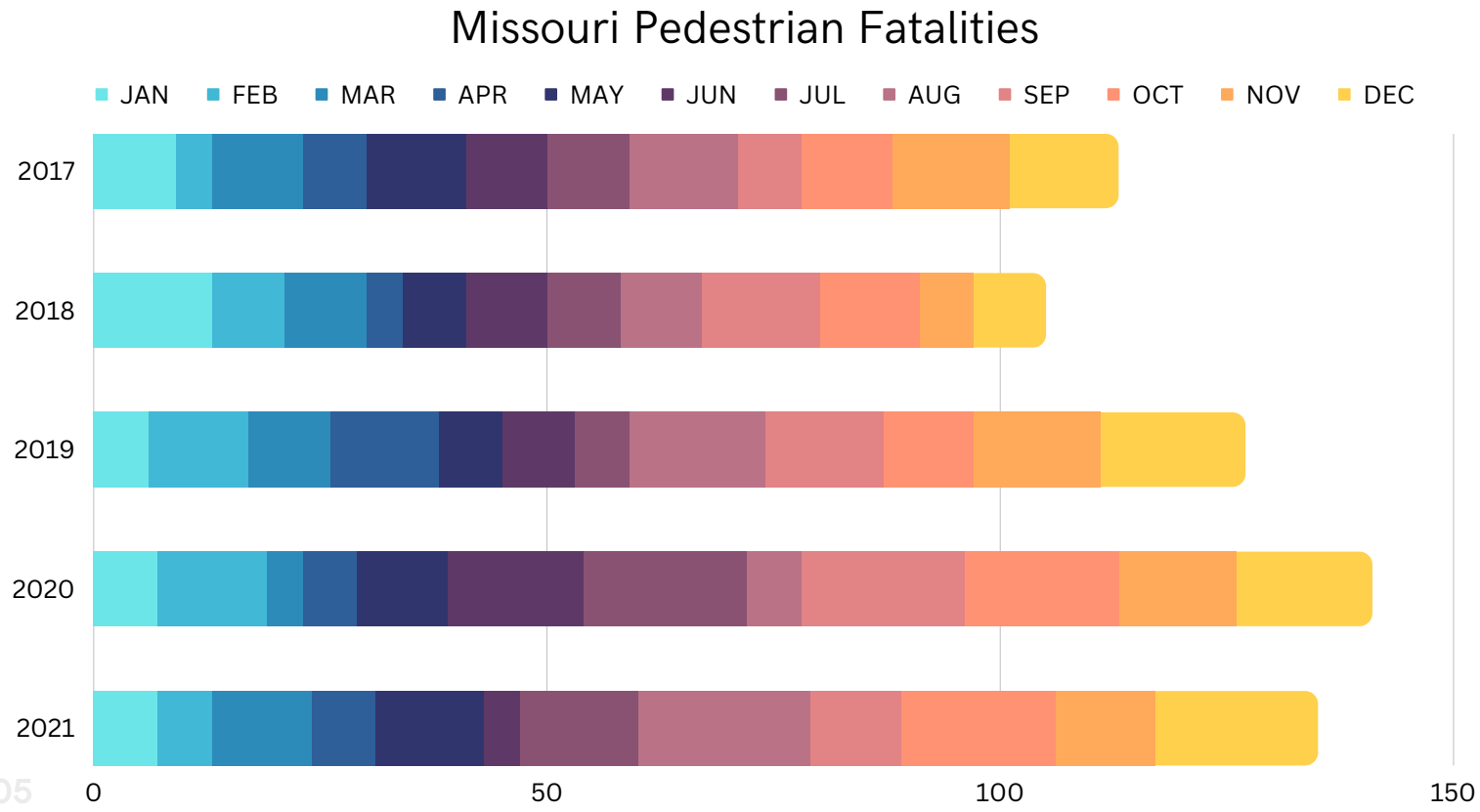
Increase in Missouri Pedestrian and Bicyclist Fatalities since 2012

Pedestrian Safety trends in Missouri follow a similar path as the national numbers. A 44%-percent increase in pedestrian fatalities from 2012 to 2021.

A safer Missouri is a better Missouri. This is the heart of Show-Me Zero, a strategic highway safety plan for eliminating fatalities and serious injuries on Missouri roadways. Through a collaborative effort of diverse stakeholders, Show-Me Zero takes a multi-disciplined approach to achieving safer roads through education, public policy, enforcement, engineering and emergency response. The idea is simple: no one can do everything, but everyone can do something.

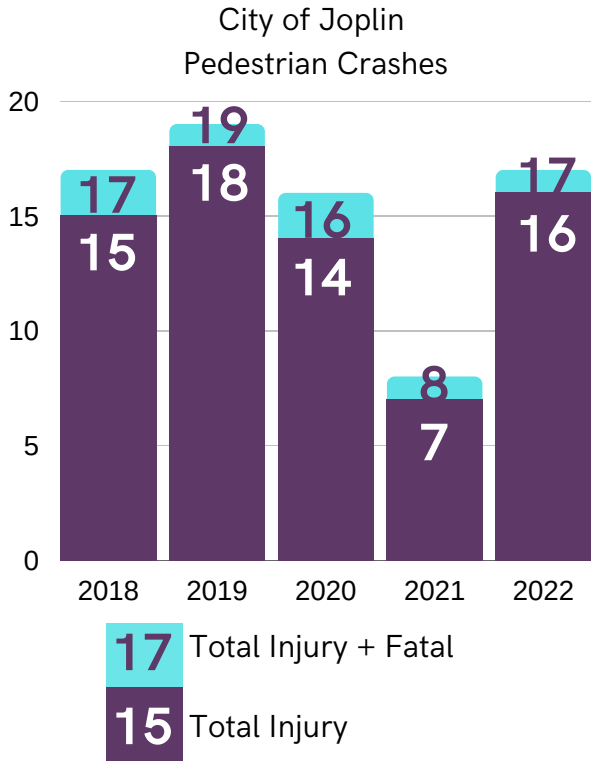
Another group warranting special attention in the Show-Me Zero plan is pedestrians and other non-motorized road users such as bicyclists and those using personal conveyances (e.g., scooters, segways). Each year, more than 100 pedestrians, bicyclists or other non-motorized road users are killed in Missouri traffic crashes with speed, distraction, and impairment being the primary causes.

The chart below illustrates pedestrian fatalities by month.



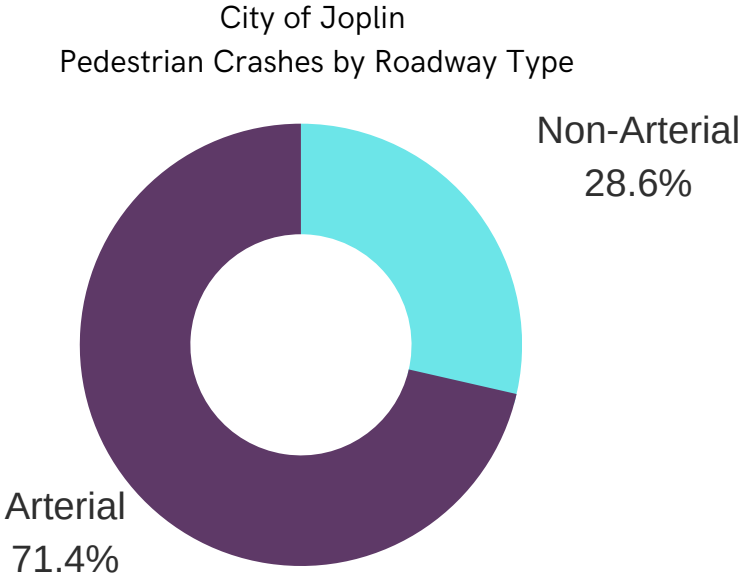
City of Joplin Pedestrian Safety Numbers

A comprehensive review of pedestrian safety data for the last five years was conducted. Data from the Missouri Department of Transportation's Traffic Management System was utilized to review pedestrian crash statistics from 2018 thru the end of 2022. Analysis reveal that an average of 15.2 crashes happen a year, of those crashes, a majority result in injury, or fatality. The graph illustrates the overall number of crashes, and the number of crashes that resulted in an injury or fatality for each of the years reviewed.



Where do pedestrian crashes occur?

After reviewing the number and type of accidents, the location of where pedestrian crashes were taking place was analyzed. It was found that 70+ percent of pedestrian accidents happen on Arterial roadways or above. Arterial types of roadways carry significantly more vehicular volumes at higher rates of speed. All of the pedestrian fatalities reviewed in this study occurred on Arterial level roadways or above.



PEDESTRIAN SAFETY STUDY
JOPLIN, MISSOURI

When do pedestrian crashes occur?

Pedestrian crashes can occur at any time, but certain factors and circumstances can increase the likelihood of these crashes happening. Some common situations when pedestrian crashes occur:

Nighttime: Pedestrian crashes are more common during nighttime or low-light conditions when visibility is reduced. Pedestrians may be more difficult for drivers to see, increasing the risk of accidents.

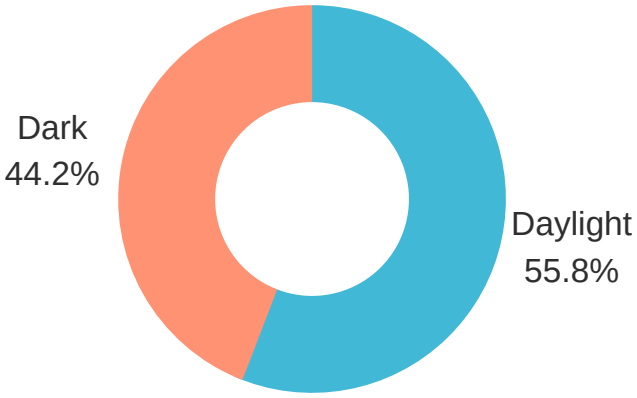
Peak Traffic Periods & Weekends / Holidays: During peak traffic periods, such as morning and evening rush hours, pedestrian crashes can occur due to increased vehicular and pedestrian traffic. Pedestrian crashes often happen on weekends and holidays when there may be more pedestrians out and about.

Impaired driving: Pedestrian crashes are more likely to occur when drivers are under the influence of alcohol, drugs, or medications. Impaired drivers have reduced reaction times and diminished awareness, making them more prone to accidents involving pedestrians.

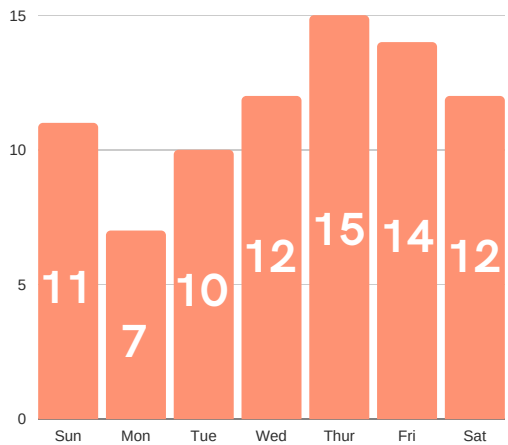
Jaywalking or improper crossing: Pedestrian crashes can happen when individuals cross the road at unauthorized locations or fail to follow traffic signals and crosswalks. Jaywalking and reckless pedestrian behavior increase the risk of collisions.

Distracted driving and walking: Both distracted drivers and pedestrians pose a risk. Drivers distracted by mobile phones, in-car technology, or other activities may fail to notice pedestrians, while pedestrians distracted by phones or other devices may not be aware of their surroundings.

City of Joplin
Pedestrian Crashes by Light Conditions



City of Joplin
Pedestrian Crashes by Day



Who do pedestrian crashes happen too?

Pedestrian crashes can happen to anyone who is walking or running on or near roadways. Pedestrians of all ages and demographics are vulnerable to being involved in these accidents. The following groups may be at a higher risk:

1. Children: Children are more susceptible to pedestrian crashes due to their smaller size, limited understanding of traffic rules, and difficulty judging vehicle speed and distance. They may be more impulsive and less attentive, increasing the likelihood of accidents.
2. Older adults: Older adults may have reduced vision, hearing, or mobility, making them more vulnerable to pedestrian crashes. They may require more time to cross the road or have difficulty judging traffic conditions, increasing their risk.
3. Intoxicated individuals: Pedestrians who are under the influence of alcohol or drugs may exhibit impaired judgment, slower reaction times, and decreased awareness of their surroundings. This can make them more susceptible to being involved in pedestrian crashes.
4. Homeless individuals: Homeless individuals may be at a higher risk of pedestrian crashes due to factors such as sleeping near roadways, impaired cognitive abilities, mental health issues, or limited access to safe pedestrian infrastructure.
5. Joggers and runners: Individuals who jog or run on or near roadways are at risk of pedestrian crashes, particularly when sharing the road with vehicles. They may be difficult to spot, especially in low-light conditions, and drivers may not anticipate their movements.
6. Tourists: Pedestrian crashes can also happen to tourists who may be unfamiliar with local traffic patterns, road regulations, or pedestrian infrastructure. Lack of familiarity with the area can increase the chances of accidents.

It is important for everyone, regardless of age or background, to exercise caution, follow traffic laws, and remain vigilant when walking or running near roadways to reduce the risk of pedestrian crashes.



Driver Distractions

The National Highway Transportation Safety Administration (NHTSA) found that in 2021 distracted driving caused 3,522 deaths an 12.0% increase from 2020.

Distracted driving is any activity that diverts attention from driving, including talking or texting on your phone, eating and drinking, talking to people in your vehicle, fiddling with the stereo, entertainment or navigation system — anything that takes your attention away from the task of safe driving.

Texting is the most alarming distraction. Sending or reading a text takes your eyes off the road for 5 seconds. At 55 mph, that's like driving the length of an entire football field with your eyes closed. You cannot drive safely unless the task of driving has your full attention. Any non-driving activity you engage in is a potential distraction and increases your risk of crashing.

In addition to driver distraction, pedestrian distraction has become more commonplace as well resulting in less aware pedestrians, reducing pedestrians ability to react to complex situations that may result when utilizing the transportation system.

Pedestrian Safety Initiatives

Pedestrian safety is a global concern that spans across the world. The efforts of the City of Joplin work in concert with efforts to enhance pedestrian and roadway safety as a state, national, and global effort. One of the current leading efforts in improving roadway safety is the Vision Zero initiative. This initiative was started in Sweden in 1997 and has spread across the globe. This initiative acknowledges that traffic related fatalities and serious injuries are often preventable and works to eliminate both through established strategies and accountability.

The Federal Highway Administration (FHWA), the National Highway Traffic Safety Administration (NHTSA), and the Federal Motor Carrier Safety Administration (FMCSA) are working with the National Safety Council (NSC) on a similar effort in the United States, the Road to Zero initiative. The Road to Zero initiative builds upon many of the same principles as Vision Zero with an ambitious goal of eliminating traffic fatalities within 30 years. The initiative also organizes a coalition of members that examines and promotes behavior-change strategies and provides funds to traffic safety organizations on a competitive basis for work on priority programs. Improving pedestrian safety is a national and international priority to which several agencies and organizations are committed. A sample of prominent organizations working on this issue are discussed below.

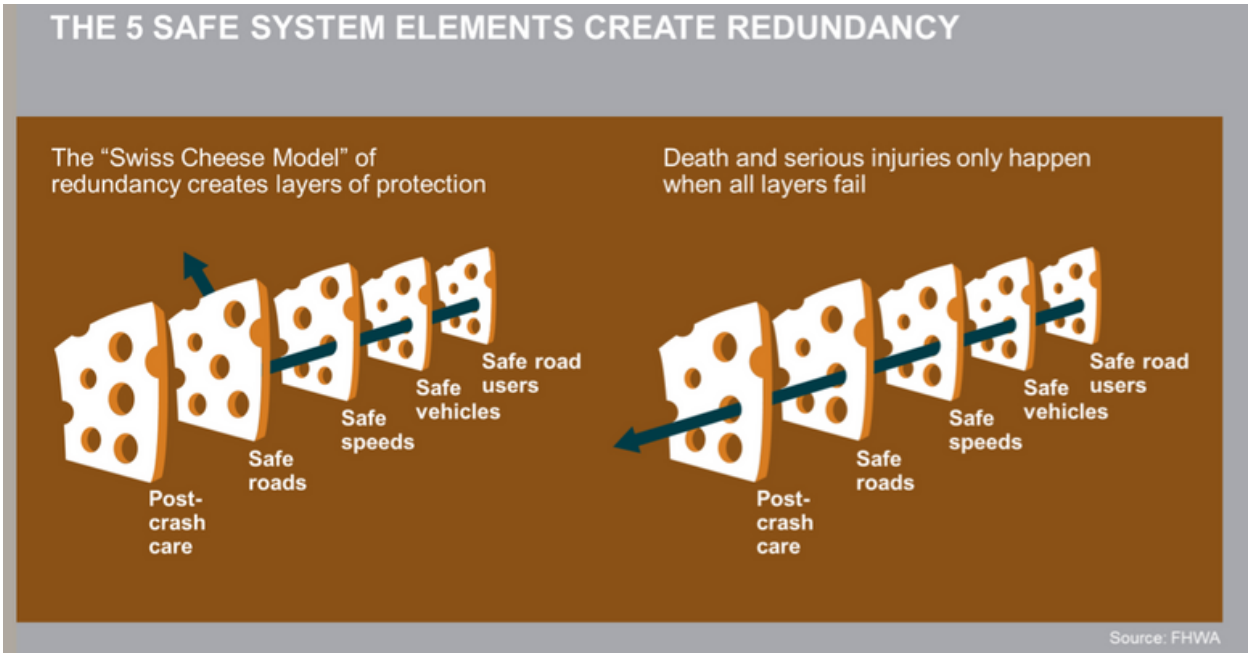
Federal Highway Administration (FHWA)

The FHWA was founded in 1966; however, the organization's responsibilities were included in the Office of Road Inquiry, founded in 1893, which changed names several times over the years. The FHWA is an organization aimed at providing "stewardship over the construction, maintenance, and preservation of the Nation's highways, bridges, and tunnels" through research, technology, and policy.

The FHWA is working to improve pedestrian safety and reduce pedestrian fatalities and injuries. The administration produced the Pedestrian Safety Strategic Plan which is a 15-year plan developed to address pedestrian safety and provide professionals and stakeholders with resources and information needed to solve problems in roadways. As described in the previous section, the FHWA has been working to reduce pedestrian fatalities by providing extra resources to 16 states with cities that have the highest number of pedestrian fatalities or highest pedestrian fatality rates.

In an effort to address roadway and pedestrian safety, FHWA has developed the safe systems approach, which is a systematic approach by all stakeholders to improve safety on the roadway network. This approach is designed to take a multifacited approach to

roadway safety and thus provide greater layers and redundancy of safety to roadway network users. The illustration below articulates that approach.



Additionally with the Bipartisan infrastructure legislation, FHWA has developed the safe streets for all program, which enables government agencies to evaluate their roadway networks from a safety perspective and make improvements to reduce vehicular crashes. One such effort is currently being undertaken by the Joplin Area Transportation Study Organization (JATSO).

Vision Zero Network

The Vision Zero Network is a collaborative campaign with a goal of helping communities, solely in the U.S., to reach the Vision Zero objective. The campaign started by launching a Vision Zero Focus Cities program. Ten cities were chosen to encourage development of successful safety practices through collaboration and the sharing of data and ideas. The selected cities are: Austin, Boston, Chicago, Fort Lauderdale, Los Angeles, New York, Portland, San Francisco, Seattle, and Washington, D.C.

SHOW-ME ZERO - Driving Missouri Toward Safer Roads

The Missouri Coalition for Roadway Safety created a plan, in line with the Road to Zero initiative, to reduce fatalities and serious injuries on Missouri roads. Called Show-Me Zero, the objective of the plan is to increase coordination, communication, and cooperation among state and local agencies, law enforcement, planning organizations, and other safety advocates in the state.

Missouri Coalition for Roadway Safety

The Missouri Coalition for Roadway Safety (MCRS) exists to end fatalities and serious injuries on Missouri roadways by advocating for the prioritization and implementation of proven safety strategies. Through cooperative efforts in education, public policy, enforcement, engineering and emergency medical services, we encourage all Missourians to take an active role in making our roadways safe for everyone.

Missouri Bike and Pedestrian Federation

The Missouri Bicycle and Pedestrian Federation is a statewide, non-profit organization that is working to improve the safety of the transportation network for bicycles and pedestrians. The organization was founded in 1993 and is working towards a 50% reduction in crashes and fatalities and a 100% increase in the number of walking and biking trips taken in Missouri. The organization promotes programs throughout the state that increase active transportation. One annual event includes meeting at the state capitol and talking with legislators as well as biking along a planned route.

National Highway Traffic Safety Administration (NHTSA)

NHTSA is a government agency with a goal to "save lives, prevent injuries, and reduce economic costs due to road traffic crashes through education, research, safety standards, and enforcement." The agency maintains a webpage specific to pedestrian safety that includes resources on safety tips, research on safety countermeasures, statistics on crashes, and much more.

Federal Motor Carrier Safety Administration (FMCSA)

The FMCSA is an agency with a mission to prevent commercial vehicle fatalities and injuries. This is approached through data, enforcement, research and technology, and safety assistance. The agency provides safety information for pedestrians which includes safety tips and crash statistics.

National Safety Council (NSC)

The NSC works to eliminate preventable deaths at work, at home, in communities, and on the road through leadership, research, education, and advocacy. The organization provides safety training, including workplace safety training and defensive driving training.

Recommendations from Pedestrian Initiative Organizations

The aforementioned agencies offer the following tips for pedestrians to reduce risk of crashes when utilizing the transportation network. Some of the important tips are as follows.

- Be predictable. Follow the rules of the road and obey signs and signals.
- Walk on sidewalks whenever they are available.
- If there is no sidewalk, walk facing traffic and as far from traffic as possible.
- Keep alert at all times; don't be distracted by electronic devices that take your eyes (and ears) off the road.
- Cross streets at crosswalks or intersections whenever possible. This is where drivers expect pedestrians.
- If a crosswalk or intersection is not available, locate a well-lit area where you have the best view of traffic. Wait for a gap in traffic that allows you enough time to cross safely, and continue to watch for traffic as you cross.
- Never assume a driver sees you. Make eye contact with drivers as they approach you to make sure you are seen.
- Be visible at all times. Wear bright clothing during the day, and wear reflective materials or use a flashlight at night.
- Watch for cars entering or exiting driveways, or backing up in parking lots.
- Avoid alcohol and drugs when walking; they impair your abilities and judgment too.

Street & Roadway Designs

Streets & Roadways are designed to optimize drivers' performance. Signs are placed in order to convey information to a driver in a timely manner. Sign placement is done in such a manner that the driver has the time to perceive the information expressed by the sign. Often times information communicated by a sign is reinforced with additional signs, curbing, and/or pavement markings. This sets an expectation for drivers as to what type of event may take place. For instance, if a driver sees a signal ahead sign, they expect from prior experience for a signal to be along the road. The placement of signs and pavement markings is guided by the Manual on Uniform Traffic Control Devices (MUTCD).

Over time drivers develop an expectation of how other roadway users will interact with them on the transportation network. Drivers expect that pedestrians will be located in certain areas or zones, mostly sidewalks & crosswalks. Furthermore, the MUTCD works to reinforce where driving and pedestrian interactions are likely to occur. When a interaction happens outside of that designated areas it can lead to driver confusion, and distraction, which could result in driver error. Drivers not only work to perceive surrounding traffic control devices, but also have to pay attention to unexpected events. It takes drivers longer to process unexpected events, and thus requires more time for them to react to those events. Erratic driver behavior caused by mis-located pedestrians in roadways can often be dangerous to both pedestrians and other road users.

Reducing the number of pedestrian fatalities and serious injuries is a goal of all transportation agencies. When a pedestrian is within the public right of way, there is a risk of vehicular contact. Street design standards and guidelines work to manage these conflicts as safely as possible. The following manuals are utilized when designing transportation facilities where pedestrians and vehicles interact. A small discussion of each about how they address pedestrians follows.

Manual on Uniform Traffic Control Devices (MUTCD)

The MUTCD, published by the FHWA, provides standards for installing and maintaining traffic devices on all public streets, highways, bikeways, and private roads open to public travel in the United States. The MUTCD is the manual that governs all traffic control devices which means that non-compliance can result in the loss of federal-aid funds and potential legal liabilities.

The purpose of the MUTCD is to promote roadway safety and mobility to all road users by providing uniformity and effectiveness in the use of traffic control devices. The MUTCD dates back to as early as 1927 after the popularization of the automobile in the U.S. The MUTCD is available to download at http://mutcd.fhwa.dot.gov

An effective traffic control device should meet the five basic requirements outlined in the MUTCD:

- It should fulfill a need;
- Command attention;
- Convey clear, simple meaning;
- Command respect from road users; and
- Give adequate time for proper response.

Roadside Design Guide

This Roadside Design Guide was developed by the American Association of State Highway and Transportation Officials (AASHTO) Subcommittee on Design through the Technical Committee for Roadside Safety (TCRS) under the chairmanship of Keith Cota, P.E. This book presents a synthesis of current information and operating practices related to roadside safety.

A noteworthy point is that this book is a guide. It is not a standard, nor is it a design policy. It is intended to be used as a resource document from which individual highway agencies can develop standards and policies. Although much of the material in the guide can be considered universal in its application, several recommendations are subjective in nature and may need modification to fit local conditions. However, it is important that significant deviations from the guide be based on operational experience and objective analysis. Below is an excerpt from the roadside design guide on intersections.

10.1.3.4. Intersection Locations

Crashes at intersections often occur between vehicles; however, intersection crashes in which vehicles hit roadside objects also are common. In some cases, the crash occurs because a driver attempts to avoid hitting another vehicle, but single vehicle crashes also occur frequently at intersection locations. The collisions can occur because of the presence of small channelization islands that are not noticeable by drivers, objects located too close to the curb in the curb return region, and objects located so that they are aligned opposite pedestrian access ramps. Roadside object placement strategies at intersections, therefore, can be addressed as follows:

- For intersection channelization islands (also known as corner islands), the island design should adhere to the criteria in AASHTO's A Policy on Geometric Design of Highways and Streets. The island should be sufficiently designed so it is conspicuous to approaching drivers while not encroaching on vehicle paths. Similarly, median noses should be conspicuous and designed they do not impede normal traffic operations. Placing rigid objects at either the corner island or the median nose should be avoided completely. Only breakaway devices should be constructed at these locations.

- Often a turning vehicle does not successfully navigate the designated turn path and strays onto the adjacent curb return or shoulder. This situation often occurs for truck-turning movements. Object placement on the inside edge of intersection turning movements should be as far as practical from the curb face or lane edge. A target lateral offset value for the intersection return should be 6 feet for curbed facilities with a minimum value of 3 feet. Similarly, for locations without curbs, these values should be as far as possible from the edge of lane because drivers will not have a curb to help them realize their vehicles have strayed from the designated turning path.
- Many urban intersections with curbs include directional pedestrian access ramps at the intersection corners. For these locations, rigid objects should not be positioned so that errant vehicles are directed toward them along the path of the access ramp. As a result, pedestrian buttons should be placed on a breakaway pedestal pole adjacent to the directional ramp rather than on a rigid traffic signal pole when possible. This will enable the traffic signal pole placement to occur further away from the curb return region and also will position the pedestrian button immediately adjacent to the appropriate access ramp.

A Policy on Geometric Design of Highways and Streets

A Policy on Geometric Design of Highways and Streets was developed by the American Association of State and Highway Transportation Officials, it is often referred to as the "Green Book". The publication provides guidance to engineers, roadway operators, and designers on the best practices for street and highway design. Below is an excerpt from A Policy on Geometric Design of Highways and Streets on median refuge.

"Median refuge is beneficial for all pedestrians. To allow for the placement of multiple detectable warnings, median and island crossings of at least 6 feet are preferred as shown in Figure 4-21. Medians less than this width must provide accessible passage but may not necessarily provide adequate refuge."

Guide for the Planning, Design, and Operation of Pedestrian Facilities
AASHTO's Guide for the Planning, Design, and Operation of Pedestrian Facilities, provides a guide for planning and designing pedestrian facilities.

Designing Walkable Urban Thoroughfares: A Context Sensitive Approach
Developed in 2010 by the Institute of Transportation Engineers (ITE) and the Congress for the New Urbanism, Designing Walkable Urban Thoroughfares: A Context Sensitive Approach, provides guidance to practitioners in planning and designing major urban thoroughfares for walkable communities. The objective of the guide is to enhance walkable communities by improving mobility choices and community character. Some of the topics in the guide include planning and developing context sensitive urban thoroughfares, travelway design guidelines, and intersection design guidelines.

Urban Street Design Guide
The Urban Street Design Guide, published by National Association of City Transportation Officials (NACTO), provides information on the design of city streets and public spaces. The Urban Street Design Guide outlines three levels of guidance: critical features, recommended features, and optional features. Critical features are elements in which there is strong consensus of necessity, recommended features are elements in which there is a strong consensus of added value, and optional features are elements that may vary across cities and may add value, depending on
the situation.

When reviewing the guides, one will find key items that improve safety for motorists and pedestrians.

SPEED - vehicle speed is one of the main contributing causes in pedestrian fatalities. One study, supported by numerous other studies, has shown that when a pedestrian is hit by a vehicle at 20 mph there is a 10% chance of death compared to an 80% chance of pedestrian fatality at 40 mph. Additionally, significant injuries may still result in connection with lower speed crashes.

VOLUME - studies have found that roadways with a volume less then 10,000 vehicles per day show a crash rate less then .25 per million pedestrian crossings at marked and unmarked crossings. This is true of the Joplin data, where a majority of the pedestrian crashes occurred along roadways with higher ADT's.

MEDIAN WIDTH - A median width is an important factor as well, as they provide refuge for pedestrians from vehicular traffic. However, smaller medians do not provide the adequate size for refuge and should not be utilized as such. Therefore, it is recommended if a median is less then 8 feet in width it not be used for refuge and therefore should encourage pedestrians to pass through.



City of Joplin Recommendations

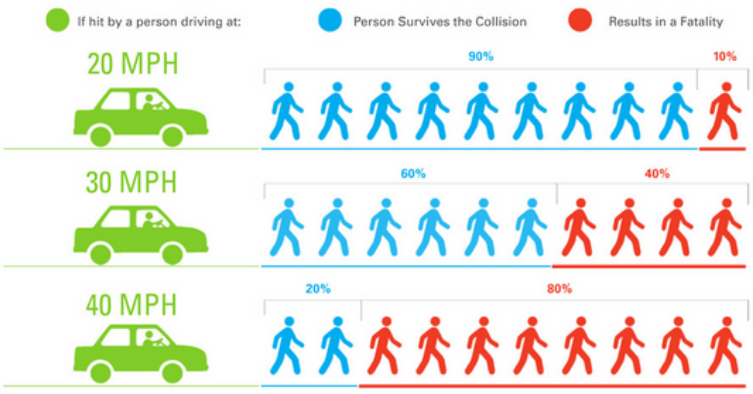
Based upon the review of pedestrian crashes in the City of Joplin, and best practices to improve pedestrian safety, it is recommended that the City of Joplin follow the goals, strategies and objectives outlined in the following tables under the overarching categories of education, enforcement, and engineering.

Further regulations are needed as it relates to higher speed and/or volume roadways and intersections. As the study found, this is where a majority of pedestrian crashes occur. Arterial roadways were found to present the highest level of danger to pedestrians. In addition, intersections of higher volume and speed also presented a higher risk for pedestrians.

Higher speed roads are defined as any roadway with a speed limit greater than 35 miles per hour, and high volumes roads for the City of Joplin are defined as anything greater then 12,000 vehicles per day, which are the arterial roadways where a majority of the crashes reviewed took place.

To facilitate safety for pedestrians and motorists, pedestrians should only be located in a roadway when:

- They are in designated pedestrian areas where motorists would expect them to be located such as crosswalks or sidewalks.
- Temporary traffic control is established to warn drivers of pedestrians for maintenance or special events.
- Utilizing low traffic volume and low speed roadways that are designed to be used as shared spaces.



Education

Goal 1: Work to educate the public on pedestrian safety

Objectives	Strategy	COUNCIL	PARTNER AGENCY	PUBLIC	CITY STAFF	Potential Funding
Educate the public on pedestrian safety, working to bring awareness to the need to improve pedestrian safety	Strategy 1: Work with the schools to develop a program to teach pedestrian etiquette and awareness at a young age					GRANTS
	Strategy 2: Share pedestrian statistics with the public through a pointed public information campaign					N/A
Reduce distracted transportation users	Strategy 1: Create initiatives to educate the public on impact of distracted driving and walking.					N/A
	Strategy 2: Enforce new State Law on banning distracted driving					N/A

Enforcement

Goal 1: Improve pedestrian safety through ordinance enforcement and adoption

Objectives	Strategy	COUNCIL	PARTNER AGENCY	PUBLIC	CITY STAFF	Potential Funding
Objective 1: Improve pedestrian safety by strengthening ordinance related to pedestrians	Strategy 1: Adopt a revised pedestrian ordinance to strengthen regulations around pedestrian safety on Arterial Roadways					N/A
Objective 2: Improve pedestrian safety by adopting a Vision Zero policy	Strategy 1: Develop and adopt a Vision Zero policy					N/A
Objective 3: Form a committee to review pedestrian crashes	Strategy 1: Develop a cross department committee of first responders, roadway operators, and other stakeholders to study pedestrian crashes on a regular basis					N/A

Engineering

Goal 1: Utilize Engineering Standards to strengthen design practices in order to support safer pedestrian facilities

Objectives	Strategy	COUNCIL	PARTNER AGENCY	PUBLIC	CITY STAFF	Potential Funding
Objective 1: Review City Policy and standards related to Street Design	Strategy 1: Develop a design approach to encourage motorists to drive the roadway at the appropriate speed					N/A
	Strategy 2: Form a Complete Street committee to review street design, and enhancements					N/A
Objective 2: Review Pedestrian Design Practices	Strategy 1: Review City Policy related to pedestrian design. Make enhancements to the policy where necessary to improve pedestrian safety					N/A