Safety and Security

Safety and security are important concerns for the transportation system. The movement of people and goods can become dangerous in areas if there are safety issues. Security concerns, whether real or perceived, can interfere with the efficient movement of people and goods using any mode of transportation. A safety or security incident may disrupt the transportation system on a large scale and have other negative effects. Transportation agencies should work with other agencies and with policymakers on how to improve the safety and security of the transportation system.

State Level Planning - Safety

The lowa Department of Transportation performs a significant portion of the state level safety planning on the transportation system in lowa. A large part of this is focused on the road system and reducing the number of crashes. The lowa DOT provides crash information in several formats on its website as well as information about safety plans and programs to reduce crashes. Some of the DOT's safety programs not only seek to address crashes on the primary road system but on county and city road systems as well.

Three areas of the Iowa DOT's state level planning will be talked about in this chapter: the Strategic Highway Safety Plan, Potential for Crash Reduction tool and the funding programs for safety improvements. Iowa's Strategic Highway Safety Plan is a document that provides a coordinated vision for reducing injuries and fatalities on all public roads. The Potential for Crash Reduction (PCR) high Levels list identifies intersections and/or road segments on state and paved secondary road systems with crash history higher than expected compared to locations with similar characteristics and traffic volumes. High PCR Levels will likely qualify for safety funds and require consultation with the Traffic and Safety Bureau to determine potential safety improvements.

Iowa Strategic Highway Safety Plan

The Strategic Highway Safety Plan is a statewide plan that provides guidance for reducing injuries and fatalities on all lowa roads. It aligns state with the national vision to eliminate all fatalities on public roads. The plan sets goals for the state to reduce those numbers and reviews the progress made. It establishes five categories or five "E's" of focus: education, emergency medical services, enforcement, engineering and



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everyone. And the plan also defines eighteen safety emphasis areas, these are areas where safety strategies will have the greatest potential to reduce injuries and fatalities. In the SHSP eight of the areas of emphasis are priorities and have strategies developed for them, these areas are: lane departures and roadside collisions, speed related, unprotected persons, young drivers, intersections, impairment, older drivers and distracted or inattentive drivers.

Crash data from the 2019-2023 Strategic Highway Safety Plan shows that Iowa saw an increase in fatal crashes between 2015 and 2016 of 26.5%. This was the largest increase in fatal crashes in the decade. Drivers under the age of 25 and over 65 represented over 35% of those involved in the fatal and serious injury crashes. A large percentage of the fatal and serious injury crashes occur in rural areas and on county or municipal roads. The 2019-2023 SHSP reported 56% of the fatal and serious crashes occurred in rural areas and there was a 16% decrease in these crashes between 2016 and 2022. During the period between 2013-2017, there were 3,075 severe injuries (fatalities and serious injuries) from crashes involving younger Drivers (under 25) and 1,696 severe injuries from crashes involving older drivers (over 65). The SHSP ranked emphasis areas by severe injuries, the younger driver emphasis area ranked 6 while older drivers emphasis ranked 9. Emphasis areas with the highest severe injury rank were: lane departures (1), speed related (3), and roadside collisions (4).

The Strategic Highway Safety Plan developed strategies for improving safety for the eight areas of emphasis that were determined as a priority and identified the category or agency of focus for each strategy. several areas. Figure 8.1 summarizes the strategies, the eight priority safety emphasis areas and category of focus.

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Figure 8.1: Strategies for Priority Safety Emphasis Areas and SE Implementation						
Emphasis	Strategy	Area				
Lane Departures	Evaluate high lane departure crash corridors	Enforcement				
	Evaluate high-friction surface treatments	Engineering				
	Place centerline and/or shoulder rumble strips on rural 2 lane highways	Engineering				
	Continue cable median barrier installations	Engineering				
	Focus on the road, don't over-correct or veer into objects or animals	Everyone				
Speed-related	Educate drivers on controlling and managing vehicle speed	Education				
	Identify corridors with high frequency of speed related crashes	Enforcement				
	Evaluate and implement signing and geometric design to moderate speed	Engineering				
	Implement speed feedback signs at targeted locations	Engineering				
	Give yoursefl enough time to reach your destination	Everyone				
Unprotected persons	Conduct public awarness on risks of unprotected persons	Education				
	Indlude medical personnel in education efforts	Emergency				
	Conduct highly publicized enforcement focused on restrained use	Enforcement				
	Buckle up everyone and every time	Everyone				
Young drivers	Improve content and delivery of driver education	Education				
	Continue educating young drivers including on impairment	Education				
	Support a coalition to address age based transportation needs	Education				
	Support young drivers to avoid distractions and impairment	Everyone				
Intersections	Develop educational resources to inform the public of interection types	Education				
	Conduct enforcement related to bicycle and pedestrians at intersections	Enforcement				
	Use systemic approaches to improve visability of intersections	Engineering				
	Implement alternative intersection design to reduce conflict	Engineering				
	Develop an intersection evaluation tool in selecting intersection types	Engineering				
	Approach intersections with caution and get familiar with new designs	Everyone				
Impairment involved	Educate drivers on impairment and effects on driving	Education				
	Employ screening and interventions in healthcare settings	Emergency				
	Support training for new drug recognition and enforcement officers	Enforcement				
	Develop and implement a standard approach to identify impaired drivers	Enforcement				
	Expand 24/7 program, place of last drink, and ignition interlock	Enforcement				
	Enhance detection through special OWI patrols	Enforcement				
	Implement countermeasures to reduce wrong way driving	Enforcement				
	Designate a driver, call a cab	Everyone				
Older drivers	Support a coalition to address age based transportation needs	Education				
	Provide education for older drivers that address age related concerns	Education				
	Update publications and resources for older drivers and their families	Education				
	Update procedures for asessing medical fitness to drive	Emergency				
	Know when to put keys down, when to leave converation	Everyone				
Distracted drivers	Develop targeted interventions for high-risk populations	Education				
	Support high-visibility enforcment for hands-free cell phone law	Enforcement				
	Put the cell phone down, avoid distractions, be alert, focus on road	Everyone				
Source: 2019 Iowa Stra	tegic Highway Safety Plan					
https://iowadot.gov/tr	raffic/shsp/home					
Accessed: August 14, 2	023					

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Potential for Crash Reduction, High PCR Locations

The Potential for Crash Reduction (PCR) map is made up state and paved secondary of intersections and road segments across the state that have been identified for safety improvement. These locations have been identified based on the Highway Safety Manual (HSM) Predictive Method to analyze existing conditions to determine the potential to reduce the total number of crashes at that location. Figures 8.2-4 show the high PCR locations in the region. Each table shows the location, the PCR and the category rank compared to other similar facilities in the state. High PCR locations will likely qualify for safety funds and require a consultation with the Traffic and Safety Bureau to identify potential safety for improvements.

Many of the intersection and road locations identified are located within the three urban areas in the region, Fairfield, Oskaloosa, and Ottumwa. Many of the locations on primary routes have higher PCR values than those on the secondary system. Several of the intersections and road segments have the same location, such as US 63 north and south of IA 92 in Oskaloosa, IA 149 and 4th Street in Ottumwa, and US 63 and Eddyville Road in Wapello County. In these locations it may be beneficial to take a wider view and look at the intersection and road segment together to understand the nature of the issue to identify appropriate solutions. More information on individual locations can be found using the PCR tool at: <u>Potential for Crash Reduction (PCR)</u> (arcgis.com)

Figure 8.2						
			All C	rashes (KABCO)	•	
INT ID	PCR / year	Category Ranking	Road 1	Road 2	County	City
2017052998	3.6787	31 / 1,559	US 63/ N Market St.	IA 92/A Ave. W/A Ave. E	Mahaska	Oskaloosa
2017079902	2.4094	31 / 49,277	W WOODLAND AVE	E WOODLAND AVE & N COURT ST	Wapello	Ottumwa
2017079339	1.6799	33 / 260	US 34	N Quincy Ave	Wapello	Ottumwa
2017121116	1.4796	118 / 1,559	IA 92/A AVE W	GATEWAY DR & CORNERSTONE DR	Mahaska	Oskaloosa
2017079385	1.4036	6 / 1,088	US 63	JS 63 Eddyville Rd		
2017079370	1.2135	90 / 625	IA 149/KITTERMAN AVE/WAPELLO S	W 4TH ST	Wapello	Ottumwa
2017042926	1.1920	124 / 49,277	W GRIMES AVE	N 4TH ST	Jefferson	Fairfield
2017079839	1.1818	126 / 49,277	E 2ND ST	S JEFFERSON ST & N JEFFERSON ST	Wapello	Ottumwa
2017121080	1.1765	128 / 49,277	US 63/N MARKET ST	B AVE W & B AVE E	Mahaska	Oskaloosa
2017079767	1.0989	33 / 5,616	E MARY ST	S MADISON AVE	Wapello	Ottumwa
2017079374	1.0533	97 / 625	IA 149/IOWA 149	E ROCHESTER ST	Wapello	Ottumwa
2017142778	1.0533	98 / 625	IA 149/IOWA 149	W WOODLAND AVE & N MCLEAN S	Wapello	Ottumwa
2017079879	1.0255	154 / 49,277	E 4TH ST	N JEFFERSON ST	Wapello	Ottumwa
2017156454	0.9958	33 / 27,975	90TH ST	US-45	Wapello	NA
			Sever	e Crashes (KAB)		
INT ID	PCR / year	Category Ranking	Road 1	Road 2	County	City
2017079385	1.4036	6 / 1,088	US 63	Eddyville Rd	Wapello	NA
2017142246	0.7684	40 / 1,303	IA 149/IOWA 149	N COURT RD CONNECTOR	Wapello	Ottumwa
2017079340	0.6383	136 / 625	US 34	IA 149/Wapello St	Wapello	Ottumwa

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Figure 8.3: High PCR Primary Road Segments in RPA 15 (2016 - 2020)							
	All Crashes (KABCO)						
Segment ID	Description	PCR/year	Category Ranking	County			
2401	IA 92 from US 63 west to near IA 432 in Oskaloosa	9.798	17 / 403	MAHASKA			
6521	IA 149 from 4th St ne to 5th St in Ottumwa	5.594	31 / 403	WAPELLO			
181	US 63 over 100th St/Pennsylvania Ave in Ottumwa	3.602	2 / 1,311	WAPELLO			
2483	US 63 from Eddyville Rd west to Comstock Creek	3.131	4 / 1,311	WAPELLO			
366	IA 23 from IA 92 south 0.03mi in Oskaloosa	2.504	57 / 403	MAHASKA			
6736	US 34 at Roemer Ave in Ottumwa	2.155	38 / 718	WAPELLO			
5607	IA 149 over DM River in Ottumwa	1.942	124 / 718	WAPELLO			
5392	IA 149 from Marion St north 1 mile in Sigourney	1.777	10 / 1,320	KEOKUK			
3307	US 63 from IA 92 north to Glendale Rd in Oskaloosa	1.719	69 / 403	MAHASKA			
3457	US 63 from Rock Island Ave north to IA 92 in Oskaloosa	1.654	31 / 1,320	MAHASKA			
6641	US 34 at IA 149/Wapello St in Ottumwa	1.532	131 / 718	WAPELLO			
2275	US 63 from 9th Ave north to Rock Island Ave in Oskaloosa	1.146	92 / 403	MAHASKA			
1826	IA 163/US 63 over Berdan St south 0.22mi in Eddyville	1.095	34 / 1,311	WAPELLO			
2634	US 63 from Co Rd H25 northeast to IA 149 in Ottumwa	1.035	40 / 1,311	WAPELLO			
Comment ID	Severe Crashes (KAB)		Cotogom, Doubing	Country			
Segment ID	Description	РСк/year	Category Ranking	County			
366	IA 23 from IA 92 south 0.03mi in Oskaloosa	0.290	3 / 403	MAHASKA			

Figure 8.4: High PCR Secondary Road Segments in RPA 15 (2016 - 2020)							
	All Crashes (KABCO)						
Segment ID	Description	PCR/year	Category Ranking	County			
11408	Burlington Ave from US 34 east to H33 in Fairfield	1.654	9 / 10,051	JEFFERSON			
11413	Burlington Ave from H33 east 33ft in Fairfield	1.517	12 / 10,051	JEFFERSON			
25001	Burlington Ave from Green Valley Ct east 0.03mi in Fairfield	1.373	6 / 1,061	JEFFERSON			
22064	Quincy Ave from Blackhawk Rd south 0.25mi in Ottumwa	0.998	31 / 10,051	WAPELLO			
11421	Burlington Ave from Fairfield ECL to US 34	0.812	53 / 10,051	JEFFERSON			
11346	W21 from 185h St northeast 1.73mi	0.675	70 / 10,051	JEFFERSON			
	Severe Crashes (KAB)						
Segment ID	Description	PCR/year	Category Ranking	County			
22261	Dahlonega Rd from near Indian Hills Dr northeast to Sugar Creek	0.0831	1/50	WAPELLO			

Funding Programs for Safety Improvements

There are several state and federal programs available to help cities and counties fund safety improvements. These programs may help with installing/replacing traffic control devices, improving traffic operations, reducing crashes and performing safety studies.

The programs listed below are administered by the lowa DOT to assist local jurisdictions with safety improvements.

County-State Traffic Engineering Program (C-STEP): Provides funds to counties to address traffic operation and safety problems on primary roads outside incorporated cities. May be used for two types of projects: spot improvements that are a single location and linear improvements. Spot improvements have a county match of 45 percent and have a maximum of \$200,000 per project. Linear improvements where the county accepts jurisdiction after completion the county match is 40 percent and has a maximum grant of \$90,000 per mile for rehabilitation and \$150,000 per mile for reconstruction. When the state retains jurisdiction the county match is 70 percent, and the maximum grant amount is \$45,000 per mile for rehabilitation and \$75,000 per mile for reconstruction. Applications are accepted year-round.

https://iowadot.gov/grants-programs/County-State-Traffic-Engineering-Program

lowa Traffic Engineering Assistance Program (TEAP): Provides traffic engineering assistance to cities and counties that do not have a traffic engineer. May be used to study high crash locations, unique lane configurations, obsolete traffic control devices, school pedestrians, truck routes, parking issues and other traffic studies. The purpose of the program is to identify cost effective improvements and funding sources that can be implemented to address an existing traffic or safety problem. Applications are accepted until funding is exhausted. https://iowadot.gov/traffic/traffic-and-safety-programs/traffic-engineering-assistance-program-teap

Traffic Safety Improvement Program (TSIP): Funds from the program may be used on any roads under city, county or state jurisdiction. Applications may be submitted for one of three types of projects: 1) site specific traffic safety improvements, 2) new or replacement of obsolete traffic control devices, 3) research studies or public information initiatives. TSIP grants have a maximum award amount of \$500,000. All types of project applications are due August 15th. <u>https://iowadot.gov/traffic/traffic-and-safety-programs/tsip/tsip-program</u>

Urban-State Traffic Engineering Program (U-STEP): Provides funds to cities to address traffic operation and safety problems on primary roads inside incorporated cities. May be used for two types of projects: spot improvements that are a single location and linear improvements span two or more intersections. City match is 45 percent, and the maximum grant amount is \$200,000 for spot improvements and \$400,000 for linear improvements. Applications are accepted year-round.

https://iowadot.gov/grants-programs/Urban-State-Traffic-Engineering-Program

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Highway Safety Improvement Program – Local (HSIP-Local): Counties and cities may use funds for low-cost systemic to medium-cost systemic safety improvements. The program has the goal of reducing fatalities and serious injury crashes. The funds are Federal-aid Swap to counties and cities for low-cost to medium-cost systemic improvements on continuous corridors, at multiple locations, or in multiple jurisdictions. Likely projects include: sign and post reflectivity, upgraded pavement markings, centerline and shoulder edge rumble strips, paved shoulders, guardrail, lane conversions and pedestrian crossing improvements. The project funds will be provided on a reimbursement basis. Applications are due by November 15th. https://iowadot.gov/traffic/sections/hsip

Highway-Railroad Crossing Safety Program: Provides funds to railroad companies, cities and counties to improve the safety of public at-grade highway railroad crossings. Priority is given based on a cost-benefit analysis, the analysis considers several factors including speed of train and effectiveness of proposed improvement. Crossings with a high likelihood of having a serious crash with a cost efficient and effective proposed improvement will get the highest priority. Funds cannot be used to establish a quiet zone. Priority is given to projects with a predicted-accident calculation of 0.075 or greater. A 10 percent railroad or roadway authority match is required. Applications are due July 1st. <u>https://iowadot.gov/iowarail/safety/federal-aid-crossing-safety-program</u>

Regional/Local Level Planning - Safety

The Regional Planning Affiliation facilitates safety planning at the regional and local levels in the region by assisting both the Iowa Department of Transportation and the cities and counties. The RPA assists the Iowa DOT by discussing transportation safety issues in regional plans, hosting discussions of regional stakeholders on transportation topics and projects including safety and facilitating the dissemination of safety information to local jurisdictions. The RPA assists the cities and counties with the development of local transportation plans that include safety elements, creating and reviewing local crash maps and developing applications for safety grant programs.

Local jurisdictions are usually the first entity to identify a safety problem on their system. Cities and counties identify safety issues through obsolescence of the facility, crash analysis, and user complaints. Some jurisdictions develop local safety plans that specifically focus on safety issues, others address projects through their regular project development cycles. In order to be prepared for safety problem on the road system that may disrupt the movement of traffic, each county in the region has developed a Traffic Incident Management map through consultation with the Iowa Department of



Transportation District 5 office. These maps identify alternate routes that may be used by emergency responders and tow companies in an emergency or may be used as a detour for traffic.

Area Crashes

In 2022 there were a total of 1,111 crashes in the region. Just over 56% of these crashes were multi-vehicle crashes and a majority (798) were property damage only. Of the total there were 9 fatal and 36 serious injury crashes. Six of the crashes were between a vehicle and a pedestrian. Maps 8.1-8.5 show the location and the severity of crashes within each county and the three urban areas. These maps show the crashes clustered in the cities or strung out along the major roads. This is expected and due to the cities and major roads having higher traffic and more potential for conflicts.

2022 Crashes

By Type: Single Vehicle – 43.7% Multiple Vehicle – 56.3% Vehicle / Pedestrian – 6

By Severity: Fatal – 9 Serious Injury – 36 Minor Injury – 124 Possible Injury – 203 Property Damage Only - 798

Maps 8.6-8.10 show how many vehicles were involved in the crash or if the crash involved a vehicle and a pedestrian. Crashes involving multiple vehicles are clustered in cities. This is a result of more conflicts between vehicles in intersections, driveways and lane changes. The locations of vehicle pedestrian crashes are in most cases in an urban area, this is because there are more pedestrians in the larger cities and there is more vehicle traffic.

An examination of the fatal and major injury crashes using the Iowa DOT's Strategic Highway Safety Plan analysis code shows that for 2021 the three areas with the highest number of fatal and major injury crashes and the number of injuries were local roads, lane departures and roadside collisions. The top two areas are the same as the top two identified statewide, the third is speed related. These three areas are the same as the top three identified statewide. The number of fatal and major injury crashes, and the number of fatalities and major injuries caused by a crash, is shown for each of the emphasis area in figure 8.5. AREA 15 REGIONAL PLANNING COMMISSION

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			Crash			Injury		
Category	Торіс	Fatal	Major	Severe*	Fatalities	Major	Severe *	%age of Severe Injuries
	Totals	7	51	58	7	58	65	
Drivers								
	Younger Drivers	0	6	6	0	6	6	9.23%
	Older Drivers	2	8	10	2	9	11	16.92%
	Speed-related	5	26	31	5	30	35	53.85%
	Impaired Driving	2	12	14	2	16	18	27.69%
	Inattentive/Distracted Driving	0	10	10	0	10	10	15.38%
	Unprotected Persons	5	19	24	5	25	30	46.15%
Highway								
	Train	0	0	0	0	0	0	0.00%
	Lane Departures	4	24	28	4	26	30	46.15%
	Roadside Collisions	2	20	22	2	24	26	40.00%
	Intersections	1	12	13	1	13	14	21.54%
	Work Zones	0	0	0	0	0	0	0.00%
	Local Roads	5	37	42	5	41	46	70.77%
	Winter Road Conditions	1	2	3	1	2	3	4.62%
Special Use	rs							
	Pedestrians	0	2	2	0	2	2	3.08%
	Pedalcyclists	0	3	3	0	3	3	4.62%
Vehicles								
	Motorcycles	0	8	8	0	8	8	12.31%
	Heavy Trucks	1	3	4	1	3	4	6.15%
	Other Special Vehicles	0	4	4	0	5	5	7.69%

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History of Crashes in the Region

Over the past five years the number of crashes within the region has decreased greatly, by about 10%, from 2018 to 2022. Figure 8.6 shows the five-year crash history for the region by each county and the three urban areas. All the counties and cities had a net decrease in crashes. Jefferson and Keokuk counties peaked in crashes in 2018, the other counties peaked in 2019. Fairfield and Ottumwa peaked in 2019, Oskaloosa in 2022. The decrease in crashes is a reinforcing sign of the effective roadway safety improvements being implemented in the region.

Figure 8.6: Five Year Regional Crash History								
	2022	2021	2020	2019	2018			
RPA 15	1,107	1,249	1,098	1,269	1,262			
Jefferson	165	238	177	229	247			
Keokuk	81	92	83	86	104			
Mahaska	283	297	260	299	291			
Van Buren	62	58	58	89	71			
Wapello	516	564	520	566	549			
Fairfield	48	102	69	119	75			
Oskaloosa	198	197	161	180	178			
Ottumwa	357	359	357	368	318			
Source: Iowa Crash Analysis Tool								
https://icat.iowadot.gov/								
Accessed: Au	Accessed: August 26, 2023							

Figure 8.7 shows a breakdown of the crashes over the last five years by severity, it also shows the number of vehicle and pedestrian crashes. As shown in this figure, the number of crashes has decreased from 2018 to 2022. Fatalities have decreased very slightly, and serious and minor injuries have decreased a little. Possible injury and property damage only crashes have decreased. Although the number of crashes has decreased, the number of people getting involved in serious and minor injuries stays relatively steady.

Figure 8.7: Five Year Crash					
	2022	2021	2020	2019	2018
RPA 15	1,111	1,255	1,106	1,239	1,264
Fatal	9	7	13	11	10
Serious Injury	36	50	27	25	41
Minor Injury	98	142	127	95	117
Possible Injury	170	187	174	195	218
Property Damage Only	798	869	765	913	878
Vehicle/Pedestrian Crash	6	9	7	7	7
Source: Iowa Crash Analys					
https://icat.iowadot.gov/					
Accessed: August 26, 2023					

Contributing Factors

Crashes are higher during winter and the beginning of summer, peaking at 1,370 in November and 1,009 in June. Both peaks are associated with changing travel patterns but likely involve high traffic counts. In November school is in session with after school activities, the first snow and ice seem to catch people off guard each year and poor weather conditions can make for hazardous driving conditions. In June, an increased number of people take to the roads for vacation, the high volume and long-distance encourages some drivers to speed. Most crashes occur during daylight so lighting conditions cannot be the primary contributing factor for a majority of crashes. The highest number of crashes occur on Friday between 4-6pm. It is the time of day when workers are returning home from work and when parents are picking up their kids from school, shopping for groceries, or on their way home. There is a high volume of traffic and impatient drivers speeding to get home. These are the perfect situational markers for traffic accidents and crashes. From 2013 to 2022, 2,026 crashes took place on Friday and 1,805 crashes from 4-6pm.

Major factors in roadway crashes appear to be animals, running off-road to the right, and failure to yield to right-of-way from a stop sign. Presumably, the animals are in the roadway and elicit a sudden swerving or brake response that results in a crash with the animal and/or a crash with a neighboring vehicle. Running off-road to the right can be linked to falling asleep at the wheel and distracted driving. Failing to yield at a stop sign can do with high speeds and feeling too comfortable on local roads. Crashes involving animals and running off-the road to the right generally occur on highways while failing to yield at a stop generally on local roads.

While most crashes did not involve another vehicle, there were a significant number of broadside and rear-end crashes. Broadside crashes are associated with failing to yield at a stop sign or any intersection. Rear-end crashes are usually associated with high traffic environments where bumper to bumper traffic exists and there is an impatient driver. Additionally, rear-ending can occur when required to rapidly decrease and increase speeds when entering and exiting a city. Poor gauging of the traffic speed in front of the driver can result in a rear-end collision. Unsurprisingly, the location of the first harmful event is predominantly the roadway and followed by the shoulder. The shoulder can have parked vehicles stopping to fix their vehicle or truckers taking a break. Animals can also be sighted in the ROW and on the shoulder before entering the roadway, so it is important for drivers to maintain peripheral awareness. Moving to the inside lane when conditions permit when observing a vehicle on the shoulder is good practice.

<u>Harmful Events</u>

For single vehicle crashes, the first and most harmful events are an overturn/rollover. They tend to be the third event in the crash, the first likely leading to the distracted state of the driver and the third leading to losing control of the car. In collisions with moving objects, colliding with vehicles in traffic ranks highest, followed by collisions with animals. They are both the most harmful and first harmful events, animal crashes ranking below. And in collisions with fixed objects, colliding in ditches or into utility poles/light supports are the first and most harmful events. They are the likely second events to occur, likely after distracted driving and losing control of the vehicle. Both expectedly lead to serious injuries and fatalities.

In terms of some of the obscure crash types, there is a small number of hit and run crashes in some of the first and most harmful events, they tend to be the second event, likely after crashing into another vehicle. Pedestrians are involved in crashes and are likely to experience more major and fatal injuries than the driver. In cases of crossing a roadway, it is important that pedestrians cross at marked crossings and cross when traffic has stopped. Similar guidance applies for pedal cyclists, but they also need to follow the road rules if riding on the road. Most crashes take place on municipal roads and can involve work zone areas. There are work zone related crashes with workers present during construction. Drivers should maintain high alertness and slow down, as posted by the work zone signage is very important because the workers are vulnerable to injury from collisions.

<u>Severity</u>

The majority of crashes each year are property damage only crashes, the highest number of property damage crashes over the last ten years being in 2019 with 913 crashes. The year with the highest number of total crashes is 2017 with 1,306 crashes. The number of crashes has been decreasing since then, but numbers are slightly varied because of the COVID-19 pandemic affecting travel. Many people were not driving and so the number of crashes went down also. Since 2017, crashes have gone down by about 15%.



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Figure 8.8 shows the number of crashes and relates injuries and property damage per crash. If there is a crash with two deaths, then it is listed as one 'fatal crash' under crash severity. Fatal injuries peaked in 2016 and 2020 at 13 fatalities and appear to be decreasing. Serious injuries peaked in 2021 at 50 injuries, but the number doesn't seem to have a steady decline. Minor injuries peaked in 2021 with 142 injuries, but the number seems to be declining. Possible/unknown injury peaked in 2016 with 222 injuries and the number has decreased slightly.



Figure 8.9: Injury Status



Figure 8.9 shows the number of people injured per crash, and in terms of injury status annually, complaints of injury are highest, and the most injuries are in 2016. The number of injuries has been going down since 2016, but 2021 saw a huge spike that could be attributed to the post-pandemic exodus to travel which increased roadway traffic and therefore the likelihood of crashes. Since 2016, the injuries have gone down by about 24%. The number of fatalities and serious/incapacitating injuries haven't changed significantly since 2013. Minor/non-incapacitating injuries and complaints of pain/injury have gone down since 2013.

Potential Safety Improvements

Figure 8.11 identifies areas of safety concern and potential projects over the next five years that have been identified to address the concerns. It includes information on the project's jurisdiction, location, and improvement. These projects were identified by the RPA Technical Advisory Committee, through Traffic Engineering Assistance Plan (TEAP) studies or Local Road Safety Plans (LRSP). Fairfield, Oskaloosa, Ottumwa, and Wapello County all had TEAP studies completed for problems in their jurisdictions. Both the Fairfield and Oskaloosa studies evaluated operations within each city's central business district. Fairfield's study focused on reconfiguring several streets from one to two way and improving pedestrian safety, this included replacing/relocating pavement markings and signage and adding pedestrian crossing improvements. In Oskaloosa the TEAP study's focus was improving traffic operations through conversation of four to

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three lanes on two corridors and adjusting the signal timing/phasing at several intersection. Ottumwa's TEAP study looked at access to the industrial park in response to several high-profile crashes and long truck queues, it included a menu of possible changes from sign relocation, shoulder widening, dedicated/offset turns, to constructing a new access road. The study for Cardinal Elementary School, in Wapello County near Eldon, recommended the addition of turn lanes from Iowa Highway 16 into the elementary school drive to alleviate traffic backing up on the highway during pickup and drop off.

A Local Road Safety Plan (LRSP) provides the basis for safety improvements along local roads. All five of the counties have LRSPs and Fairfield and Oskaloosa have plans too. The LRSP uses a risk factor analysis to assist local jurisdictions in understanding the types of crashes occurring on their roadways and is a locally focused plan that allows the jurisdiction to make informed and prioritized safety decisions. The benefits of an LRSP are: an analysis of risk and not just crash history, coordination between various local agencies, results of the analysis can be used to leverage funding, includes all five E's of safety (Engineering, Emergency, Education, Enforcement and Everyone). Figure 8.10 lists the completed local road safety engineering projects for each county/city by project and figure 8.11 lists the potential projects.

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11gule 0.10. Al	eas of Salety concern and completed Proj	
City/County	Location	Project
Fairfield	Libertyville Rd: 227th St in CL to	Widening
	Libertyvile CL	
Ottumwa	N Court St (IA 149 frontage Rd) and Fox	Widen the turn radii
	Sauk Road	
Mahaska Co	G5T: Skunk River to US 63	Grind rumble strip centerlines
		and edgelines
Oskaloosa	Any signalized intersection	Update signal timings, upgrade
		traffic signal controllers, replace
		pedestrian signal indicators with
		countdown indicators
Oskaloosa	A Avenue and Market Street	Remove protected left turn signal
		phasing for A Avenue when signal
		is upgraded
Oskaloosa	A Avenue at L St, Market St, 1st St, 3rd St	Upgrade traffic signals to fully
	and 11th St	actuate including pedestrian
		pushbuttons
Oskaloosa	A Avenue between Hwy 432 and ECL	Convert from 4 lane to 3 lane with
		continuous left turn lane
Oskaloosa	Market Street between 16th Ave and 2nd	Convert from 4 lane to 3 lane with
	Ave	continuous left turn lane
Oskaloosa	C Avenue and Market Street	Install fully actuated traffic signal
Oskaloosa	IA 23 and 3rd Avenue	Remove traffic signal, install stop
		control on 3rd Ave
Van Buren	All 55mph approaches to state highways	
	and V56 approaching J40.	Install approach rumble strips
Sources: RPA 1	15 Technical Advisory Committee	
Oskaloosa TEA	P Study dated July 27th, 2018	
Ottumwa TEAF	Study dated February 24th, 2018	

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Figure 8.11: Areas of Safety Concern and Potential Projects							
City/County	Location	Project					
Fairfield	4th and Merrill, Main and Burlington, Main and Washington, Main and Madison, Main and Fillmore, Broadway and 2nd	Pedestrian Crossings					
Fairfield	Burlington/Main	Mast Arms					
Fairfield	Mint Blvd	Trail relocation					
Ottumwa	IA 149 and Fox Sauk Road	Possible improvements include: sign relocation, shoulder replacement/widening, create dedicated turn lane, provide offset turns, provide protected turns at Rochester Rd					
Ottumwa	Ottumwa Industrial Park	Extend Fox Sauk East to 120th St					
Ottumwa	Quincy Ave CPKC crossing	Possible improvements include: advance warning of crossing being blocked, paving Blackhawk east and 163rd/170th, grade separation					
Jefferson	110th St	Paved shoulders					
Jefferson	H43	Paved shoulders and some guard rails on curves					
Wapello	87th St from county line to 163rd Ave	Widen streets					
Wapello	select Bluegrass Rd curves	Grade and widen street					
Wapello	Isabelle Rd	Pavement extension					
Wapello	IA 16 and Cardinal Elementary School	Add left and right turn lanes					

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Keokuk Co	G48 from Highway 149 to Highway 21,	Add 2' paved shoulder w/ safety
	V5G from Highway 78 to 305th St, G13	edge, widen granular shoulders,
	from V44 to Highway 149, V67 from V56	fatten foreslope, add edge and
	to Highway 22, G6 from W15 to	center rumblestrips pavements,
	Washington CL, G38 from W15 to	add and update pavement
	Washington CL, V45 from Highway 92 to	markings and signs, extend
	highway 22. G13 from Highway 21 to ECL	culverts
	of Gibson. G29 from Highway 21 to	
	Mahaska CL, V12 from Highway 92 to NCL	
	of Delta, V37 from Highway 149 to	
	Wapello CL, V41 from Highway 149 to	
	Wapello CL, V51 from Highwy 78 to	
	Jefferson CL, V63 from Highway 78 to	
	Jefferson CL, Paved roads to Belva Deer	
	Park (240th Ave, 242nd Ave, 250th Ave	
	and 200th St)	
Keokuk Co	G48 from Highway 149 to Highway 21	Remove barrier between 165th
		Ave and 180th Ave
Keokuk Co	W15 S22 T74N, R10W N and S of 314th	Construct grade separated
	including CP RR crossing	crossing and include replacement
		of Co bridge 402255
Keokuk Co	W15 from Highway 92 to Highway 22, G29	Widen granular shoulders, fatten
	from Highway 21 to Mahaska CL	foreslope, add and update
		pavement markings and signs,
		extend culverts
Mahaska Co	G5T and T33	Active Intersection warning
		system for T intersection
Mahaska Co	Highway 63 to Oxford Avenue, Gambell	Edge and Centerline Rumbles,
	Avenue to Joiner Avenue, Eaton Ave/163	Safety Edge, Grooved in
	Intersection south and east to 220th	Pavement Markings, Updated
	Street/163 Intersection through	Signs, Updated Pavement
	Leighton, Urbana Ave to Keokuk County	Markings
	line, Hickory Ave to Highway 63, Highway	
	63 to 220th Street, Highway 92 to just	
	south of Monroe Street in Rose Hill	
Sources: RPA	15 Technical Advisory Committee	
Cardinal Eleme	entary TEAP study dated July 19th, 2019	
Fairfield TEAP	Study dated March 15th, 2022	
Oskaloosa TEA	AP Study dated July 27th, 2018	
Ottumwa TEA	P Study dated February 24th, 2018	

Rail Safety

Rail crashes of all kinds, including derailments and track or equipment failures have decreased significantly over the past 40 years, at the same time rail traffic has increased. More importantly rail crossing crashes involving trains and automobiles has decreased. This indicates that rail safety and rail crossing safety has improved substantially over this time period. Figure 8.12 shows the number of rail crashes except for rail/auto crashes in each county for the last ten years. This figure doesn't show a positive trend for rail crashes in Wapello County because on average there is 1 crash every year. The two other counties to have crashes are Jefferson and Mahaska counties. Figure 8.13 shows the number of rail crossing crashes in each county during the same time period. Similar to rail crashes, Wapello County has the most rail crossing crashes in 2022.

Figure 8.12:	Rail Crashes l	by County f	irom 2013 t	:o 2022 (Ex	cluding Rai	il-Auto Cra	shes)			
County	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Jefferson	1	0	0	0	0	0	0	0	0	0
Keokuk	0	0	0	0	0	0	0	0	0	0
Mahaska	0	0	0	0	0	0	0	1	0	0
Van Buren	0	0	0	0	0	0	0	0	0	0
Wapello	0	3	1	0	1	1	1	1	2	0
Source: Fede	eral Railroad A									
https://safetydata.fra.dot.gov/OfficeofSafety/publicsite/query/AccidentByStateRailroad.aspx										
Accessed: August 14, 2023										

Figure 8.13:	Rail Crossing	Crashes by	County fr	om 2013 to	2022					
County	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Jefferson	1	0	0	0	0	0	0	1	0	3
Keokuk	0	0	0	0	0	0	0	0	0	0
Mahaska	1	0	0	0	0	0	0	0	0	0
Van Buren	0	0	0	0	0	0	0	0	0	0
Wapello	1	0	0	1	1	0	3	2	0	1
Source: Federal Railroad Administration 2018										
https://safet	ydata.fra.doi	t.gov/Offic	eofSafety,	/publicsite,	/query/Hw	yRailAccide	entSumma	ryByRR.as	рх	
Accessed: August 16, 2023										

Multidisciplinary Safety Committee

The multidisciplinary safety committee consists of law enforcement, public works/engineering, Iowa State University Local Transportation Assistance Program, Governor's Traffic Safety Bureau, Area 15 Regional Planning, Emergency Management, Fire Service, and Tow companies. They've been meeting since 2017 and AREA 15 REGIONAL PLANNING COMMISSION

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reviewing crash data that 911 dispatch centers provide to the Iowa DOT Traffic Management Center. They look for opportunities for improvement such as how incidents are handled or improving infrastructure, like the turn lane modification on Hwy 63 – Eddyville Rd intersection. In addition, the Sheriff has an ongoing project to add traffic cameras at key intersections in the county to provide intel for law enforcement and capture accidents that provide a valuable visual understanding of what happens during crashes; this was used for the Hwy 63 – Eddyville Rd intersection.

Security Planning

The Iowa Department of Homeland Security is the lead agency for security planning at the state level. This planning is focused on protecting people and infrastructure from natural and manmade disasters. Iowa HSEMD planning includes the Strategy for Iowa Homeland Security and Emergency Management and Iowa Comprehensive Mitigation Plan. The Strategy for Iowa Homeland Security and Emergency Management is a guide to how resources will be allocated, and agencies will work together to protect infrastructure or in response to a disaster. Iowa's Comprehensive Emergency Plan assesses the risk to infrastructure and discusses the state's capabilities for mitigation.

The Iowa Department of Transportation assists with security planning at the state level working with the Iowa Department of Homeland Security to develop strategies for protecting transportation infrastructure. The Iowa DOT also assists Iowa HSEMD with monitoring the transportation system for travel conditions, incidents and construction that disrupt the normal movement and providing that information to decisionmakers and the public.

Security planning at the local level is centered around the local emergency management commission, and the appointed emergency management coordinator. Each county has a commission and a coordinator, and their role is to develop an emergency plan for the governments within the county, coordinate training between local jurisdictions to test emergency plans and capabilities and coordinate a response in an actual emergency. Emergency management commissions in Iowa maintain several plans to assist with emergency situations: A Comprehensive Emergency Management Plan and a Hazard Mitigation Plan.

The Comprehensive Emergency Management Plan for each county describes how to deal with disasters and emergencies and the roles of different agencies and organizations. The plan can be divided into five sections: the base plan, emergency support functions, support annexes, incident annexes and appendices. The basic plan

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describes the organizational structure, phases of emergency management and general responsibilities. Emergency Support Functions combine resources and capabilities needed for responding to types of emergences to form a response. Support Annexes discuss essential supporting information that is shared among incidents. The Incident Annexes describe response details unique to specific types of incidents. In the event of an emergency the Emergency Support Functions would be the section used in developing the response. Figure 8.14 shows when the Emergency Support Function relating to transportation or evacuation in each county was last updated.

The Hazard Mitigation Plan encourages the long-term reduction of vulnerability to natural and man-made hazards, with the goal of saving lives and protecting infrastructure. The plan identifies hazards, both

Figure 8.14:	Local Emergency Plans	
	ESF related to evacuation,	Hazard Mitigation Plans,
County	last updated	last updated
Jefferson	2018	2016
Keokuk	2020	2018
Mahaska	2020	2016
Van Buren	2017	2016
Wapello	2016	2021

natural and man-made, that may impact a community and mitigation actions that can be taken to reduce the impacts of the identified hazards. The process is intended to engage stakeholders to develop strategies and the plan to serve as a guide for decision makers to invest resources in how to protect the community. Figure 8.14 shows when the Hazard Mitigation Plan for each county was last updated.

The transportation infrastructure vulnerabilities identified in county Hazard Mitigation Plans has been bridges and culverts. These infrastructure items have a risk of failure during a natural disaster such as flooding and can have significant costs to replace after an event. The primary strategy identified in the Hazard Mitigation Plans to reduce the vulnerabilities of these structures is to maintain or replace bridges and culverts proactively based on their condition and importance.

The Area 15 Regional Planning Commission provides assistance to jurisdictions within the region with hazard mitigation planning and with grant writing. The RPC has assisted four counties update their hazard mitigation plans and assisted local jurisdictions with grant applications for: storm shelters, tornado sirens and firefighting equipment.



Map 8.2: 2022 Keokuk County Crash Location and Severity N



Map 8.3: 2022 Mahaska County Crash Location and Severity



Map 8.4: 2022 Van Buren County Crash Location and Severity N



Map 8.5: 2022 Wapello County Crash Location and Severity







Map 8.8: 2022 Mahaska County Crash Location and Type





Map 8.10: 2022 Wapello County Crash Location and Type





Legend



