



Minnesota Fatal Pedestrian crashes – 2018 to 2022

Loren Hill, P.E. | Safety Engineer
State Aid For Local Transportation (SALT)

Purpose and Methodology

Determine whether Drive or Pedestrian was “Key contributor”

Minnesota Crash Mapping Analysis Tool (MnCMAT) was used to select the crashes. The filters used were:

- **Reportable Only**
- **Year** = 2018 to 2022 (5 Years)
- **Crash Severity** = Fatal
- **Basic Type** = Pedestrian

This resulted initially in 236 crashes. 28 were eliminated for various reasons – most because the victim was on a Bike, Wheelchair, Scooter, ATV or Horse. The resultant database was **208 crashes**.

Right Turn Involved?

Right Turn? – this was added because there are discussions involving eliminating the universal RIGHT TURN ON RED laws. I only found 1 crash that involved a Right turn (see below)

	Unit 1	Unit 2	Unit 3	Unit 4
Unit Type	Motor Vehicle in Transport	Pedestrian		
Vehicle Type	Pickup			
Direction of Travel	Westbound			
Maneuver	Turning Right	Walk/Cycle Across Traffic (X-		
Age/Sex	74 M	79 M		
Physical Cond	Apparently Normal	Apparently Normal		
Contributing Factor 1	No Clear Contributing Action	Unknown		

OFFICER SKETCH	NARRATIVE
<p style="text-align: right; font-size: small;">(Not To Scale)</p>	<p>UNIT 1 WAS SOUTHBOUND ON ELM AVE S AT THE INTERSECTION OF ELMMAIN ST E. UNIT 1 WAS IN THE TURN LANE TO MAKE A RIGHT (WESTBOUND) TURN ONTO MAIN ST E FROM ELM AVE. UNIT 1 STATED HE HAD HIS BLINKER ON AND HAD A RED LIGHT (SO HE COULD TURN RIGHT). UNIT 1 STATED HE STARTED TO MAKE HIS TURN AND THEN ALL OF A SUDDEN HE SAW THE MALE IN FRONT OF HIS VEHICLE AND IT WAS TOO LATE TO DO ANYTHING. WITNESS STATED THAT HER EASTBOUND LIGHT ON MAIN ST E WAS ALSO RED. WITNESS STATED THAT SHE SAW UNIT 1 TURNING AND THEN HIT THE MALE WHO WAS IN THE MARKED CROSSWALK. I WATCHED THE CYCLES OF THE LIGHTS MULTIPLE TIMES AND WHEN THE EASTWEST LIGHTS ARE RED AND THE SOUTHBOUND LIGHT IS RED, THE WALK SIGNAL REMAINS RED (DO NOT WALK). PHOTOGRAPHS WERE TAKEN OF THE SCENE. UNIT 2 HAD A HEAD INJURY AND WAS TRANSPORTED TO THE OWATONNA HOSPITAL BY GROUND MAYO, THEN FLOWN TO ST.</p>

Previous Crash or Other Incident?

- **Previous Incident?** There are numerous crashes that involve a person who is only on the trafficway because they were involved in a previous incident (crash, stalled vehicle, etc.). There was a total of 25 which were tagged in this column, with these various reasons:

Previous Incident?	Count
Previous crash	16
Stalled veh	2
picking up a dead dog	1
hit by Veh#1, run over by Veh#2	1
passenger left veh, then got backed over	1
picking up fallen cargo	1
ran into veh#1, lying in road when hit by veh#2	1
ran out of gas	1
Veh hit veh 2 into peds	1
Total	25

Location of Pedestrian

- **Location of Pedestrian** - where was the pedestrian when struck? Most (90%) were in the travel lanes.

Location of Pedestrian	Count
Lane	188
Shoulder	15
Sidewalk	3
Alley	1
Median	1
Total	208

Crossing the Road?

- **Was the Pedestrian Crossing the Road?** and if so, **Were they crossing at a Crosswalk?**
 - The left table below shows that most crashes (58%) had pedestrians that were attempting to cross the road.
 - The right table shows that of those 121, that 55 were not at a cross walk, while 66 were at a crosswalk.

Were they crossing?	Count	Crossing at Crosswalk?	Count
Yes	121	No	55
No	87	Marked	41
Total	208	Unmarked	25
		Total	121

Traffic Control

Traffic Control

- The majority of crashes (63%) occurred where there was no traffic control - typically not at an intersection. The second highest (22%) was at Signalized intersections.

Traffic Control Device	Count
No Controls	132
Traffic Control Signal	46
Not Applicable	20
Stop Sign	7
Other	2
Person (Flagger, Police,	1
Total	208

Where did they occur?

- Where did they Happen?

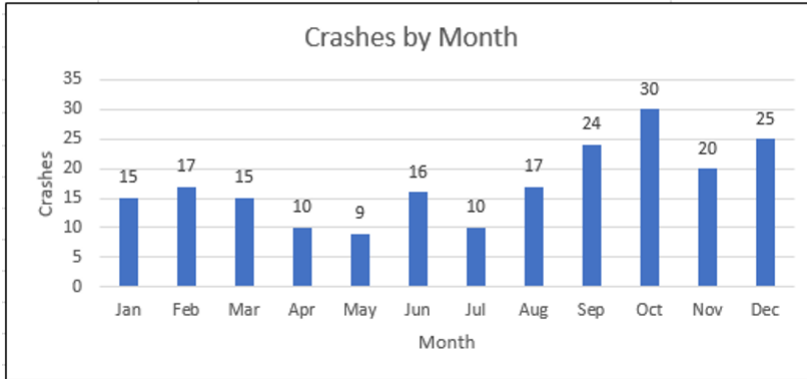
- Metro District had more than half of the crashes.
- Trunk Highways had 78 crashes (9 + 18 + 51), County Roads had a total of 66 (64 + 2), while City streets had 62 (39 + 23).
- Roads with Speed Limit of 35 or less had 86 (41%) crashes, and Speed Limit of 55 or more had 62 (30%) crashes.

MnDOT District	Count	Route -System	Count	Speed Limit	Count
D1-DULUTH	12	01-ISTH	9	5	1
D2-BEMIDJI	6	02-USTH	18	20	5
D3-BRAINERD	33	03-MNTH	51	25	7
D4-DETROIT LAKES	9	04-CSAH	64	30	53
D6-ROCHESTER	15	05-MSAS	39	35	20
D7-MANKATO	7	07-CR	2	40	24
D-METRO	126	10-MUN	23	45	19
Total	208	13-IND	1	50	9
		22-RAMP	1	55	34
		Total	208	60	15
				65	8
				70	5
				Unknown	8
				Total	208

Month of Year

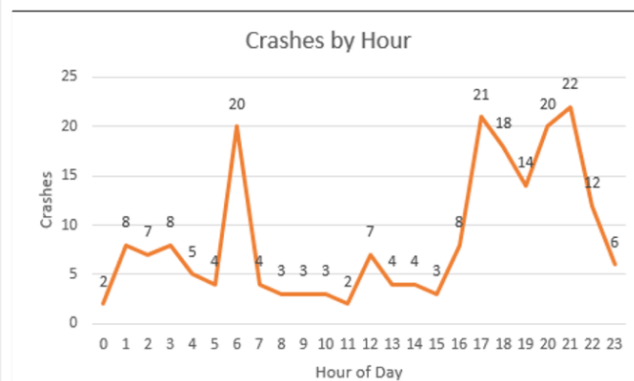
When did they Happen?

- Most crashes occur in the Fall, with October the highest single month.



Time of Day

- Most crashes happened in the evening or early morning. Only 48 (23%) occurred during Daylight. **“Not Visible (dark clothes, no lighting, etc.)”** was cited either as a **Contributing Factor** or in the Narrative in 36 of the crashes.



Light Condition	Count
Dark (No Str Lights)	54
Dark (Str Lights Off)	7
Dark (Str Lights On)	88
Dark (Unknown Light)	2
Daylight	48
Sunrise	3
Sunset	6
Total	208

Not Visible	36
--------------------	-----------

Environmental Conditions

What were the Environmental Conditions?

The environmental conditions were not a large factor – most occurred when the weather was Clear or Cloudy (86%) and the Roads were Dry (73%). This is perhaps because pedestrians are not out as much in inclement weather.

Weather	Count	Road Surface	Count
Clear	143	Dry	152
Cloudy	36	Wet	41
Rain	13	Ice/Frost	8
Snow	8	Snow	4
Fog/Smog/Smoke	4	Slush	2
Sleet, Hail (Freezing Rain/Drizzle)	1	Unknown	1
Unknown/Other	3	Total	208
Total	208		

Key Contributor

This determination was done by the author based on years of experience looking at thousands of crash reports. This determination could perhaps be described as similar to a Court decision:

- The determination was based on a 'preponderance of the evidence', not on 'beyond a reasonable doubt.'
- If no determination was established, it was similar to a 'hung jury', with a Key Contributor of '?'.

For each crash the Narrative and Sketch were examined, as were the **Contributing Factor** and **Physical Condition** data elements. The general rule was:

- If neither the Driver or Pedestrian had any indicators, OR if they both had indicators, the Key Contributor was assigned '?'
- If the Driver had no indicators but the Pedestrian had one or more, the Key Contributor was assigned 'Pedestrian.'
- If the Pedestrian had no indicators but the Driver had one or more, the Key Contributor was assigned 'Driver.'

Key Contributor

In addition, for many the crashes, a Google search was done to determine if there was more information after the crash. This was especially helpful for the Hit and Run crashes when you have little or no information on the driver.

A data element was added for each crash which explained the principal **REASON** the for the determination. The reason will be shown for each Key Contributor category below.

The determination resulted in all crashes falling into one of three categories with results as shown below:

Key Contributor	Count	Percent
Pedestrian	110	53%
Driver	64	31%
?	34	16%
Total	208	

DRIVER Key Contributor

There was a total of 64 crashes where the **Driver** was determined to be the Key Contributor. The Reasons are shown below. Note also there were 19 Hit and Run drivers, some of which were found later by a Google search to have been charged with Vehicular Homicide. Also note Passenger cars were the largest number of vehicles.

Principal Reason	Count	Vehicle Type	Count
Vehicular Homicide	23	Motor Vehicle in Transport	45
Fail to yield ROW	10	Hit-And-Run Vehicle	19
Careless Driving	7	Total	64
Distracted	6		
Fail to keep in Lane	6		
Alcohol	3	Vehicle type	Count
Speeding	2	Passenger Car	32
Backing out of driveway	1	Sport Utility Vehicle	17
Drugs	1	Pickup	10
Fail obey TCD	1	Medium / Heavy Trucks (> than 10K)	1
Hit stopped car on shoulder	1	Passenger Van (Seats Behind Driver)	1
Medical	1	School Bus	1
Ped directing traffic	1	Unknown/Other	2
Sun in eyes	1	Total	64
Total	64		

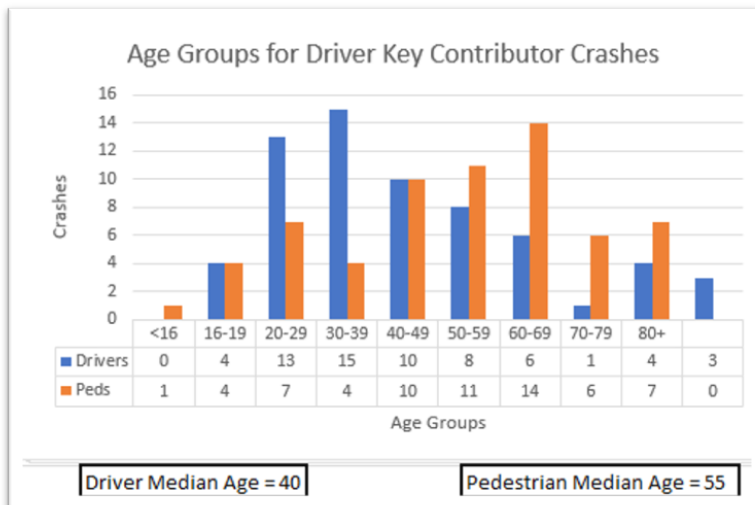
DRIVER Key Contributor

Alcohol and drugs were cited for 21 of the Drivers, even if not cited as the Key Contributor. The sex of the Driver is predominantly Male (64%), while the sex of the Pedestrians is only 53% Male.

Driver Alcohol/Drugs	Count	Driver Sex	Count	Pedestrian Sex	Count
Alcohol	14	Male	41	Male	34
Drugs	7	Female	20	Female	29
No	43	Unknown	3	Blank	1
Total	64	Total	64		64

DRIVER Key Contributor

The median Age of the Drivers (40) is significantly less than the median Age of the Pedestrians (55).



PEDESTRIAN Key Contributor

Pedestrian Key Contributor Crashes

There was a total of 110 crashes where the **Pedestrian** was determined to be the Key Contributor. The Reasons are shown below. **In Roadway Improperly** was the largest reason. Note there were 13 Peds which either were Cited for Alcohol or Drugs (even if was not the principal Reason). Also note 23 of the Pedestrians were noted as Not Visible (even if not the principal Reason).

Principle Reason	Count	Peds Drugs/Alcohol	Count
In Rdwy Improperly	40	Alcohol	12
Fail obey TCD	21	Drugs	1
Dart/Dash	21		
Dark clothes	13		
Fail to Yield ROW	7		
Crossing not at a cross	4	Not Visible	23
Alcohol	2		
Rain	1		
Wrong way walking	1		
Total	110		

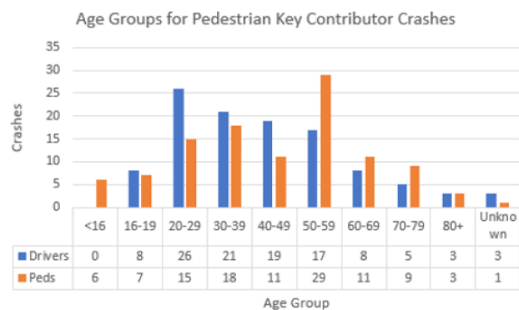
PEDESTRIAN Key Contributor

The Sex of the Driver is predominantly Male (69%), as is the sex of the Pedestrians (65%). Note previously that the sex of Pedestrians for Driver Key Contributor crashes was only 52% -- when Pedestrians 'cause' crashes, they are Male in a larger proportion than when they are 'victims'.

Driver Sex	Count	Pedestrian Sex	Count
Male	76	Male	72
Female	31	Female	37
Unknown	3	Unknown	1
Total	110	Total	110

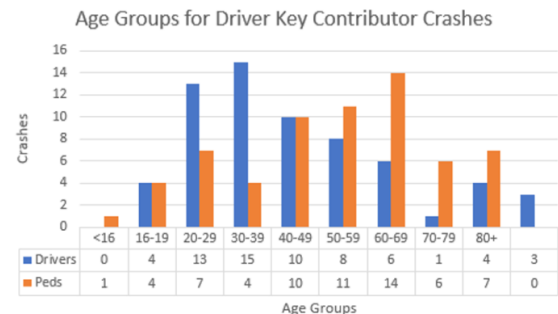
PEDESTRIAN Key Contributor

The Age of the Drivers is very close for both Pedestrian Key Contributor crashes (median age = 37) and Driver Key Contributor crashes noted above (median age = 40). However, the Age of Pedestrians are significantly lower for Pedestrian Key Contributor crashes (median age = 46) than for Driver Key Contributor crashes noted above (median age = 55).



Driver Median Age = 37

Pedestrian Median Age = 46



Driver Median Age = 40

Pedestrian Median Age = 55

'?' Key Contributor Crashes

There was a total of 34 crashes where the Key Contributor was not determined. The Reasons are shown below. The primary reasons are:

- No factors were cited for either the Drive or the Pedestrian.
- Hit & Run crash with no Driver information and no factors cited for the Pedestrian.
- Both Driver and Pedestrian had factors cited.

Principal Reason	Count
H&R	9
Driver distracted & In Rdwy Improperly	2
Alcohol both	1
Fail to yield both	1
Speed & dart/dash	1
None	20
Total	34

CONCLUSION

Pedestrians were determined to be the Key Contributor in 110 of the 208 crashes. Furthermore, even though the Pedestrian was not the Key Contributor in the other 98 crashes, *they were always the victim*. It is then apparent that the most effective strategies to reduce Pedestrian fatalities should be directed toward Pedestrians.

Factors:

1. 25 crashes happened after a previous crash or other situation.
2. The Pedestrian was in the roadway in 188 of the 208 crashes.
3. The crashes occur in both high and low speed locations.
4. While most occur with No traffic control, 22% occur at Signalized intersections.
5. Only 23% of the crashes occur during daylight.
6. **Not Visible** was cited in 36 crashes.
7. The highest number of crashes occur in the Fall.
8. Drivers consistently had a lower Age than the Pedestrians. However, the Age of Pedestrians are significantly lower for Pedestrian Key Contributor crashes than for Driver Key Contributor crashes.

STRATEGIES

- Infrastructure
 - Sidewalks
 - Median Refuge Islands
 - Bump outs
 - Lighting
- Education
 - Reflective Clothing or Illuminated Clothing!!!
 - Stay off the roadway!! Get off roadway if a previous incident!!
 - Look for vehicles – walk facing traffic!!
 - Look for vehicles – 22% of crashes happen at signalized intersections!!
 - Persons of all Ages are vulnerable!!



Questions?