FY 2015

District 2 Planning & Engineering

LUC-20-13.41 Safety Study
Reynolds Road (U.S. Route 20) at Hill Avenue
City of Toledo
Urban Intersection Rank #5

Planning & Engineering

Department

ODOT District 2

3/1/2015

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A. PURPOSE AND NEED

The purpose of this study is to evaluate the existing safety conditions and to identify potential countermeasures at the intersection of US-20 (Reynolds Road) and Hill Avenue in the City of Toledo. This intersection has been selected for study by the FY 2015 Highway Safety Program.

A review of crash data yielded 86 relevant crashes within the study area during the 3 year period of 2011-2013. During this time 27 (31%) of the crashes resulted in injury. This value is above the 2009-2013 statewide average of 25.4% for injury crashes on non-freeway state systems. There were no fatal crashes within this intersection during the study period.

A comparison of crash type and condition percentages at the intersection of US-20 and Hill Avenue, to the statewide average yielded the following results (statewide average in parentheses). The study site exceeds the statewide average in the following:

- Injury crashes: 27 crashes – 31% (25.4%)
- Rear end: 51 crashes – 59% (30.9%)
- Left turn: 16 crashes – 19% (5.2%)

B. EXISTING CONDITIONS AND BACKGROUND

This intersection is located in Toledo, Ohio and is currently controlled by a traffic signal. At this intersection, the North and South legs of US-20 both have 2 thru lanes, 1 left turn only lane and a channelizing island which separates thru and right turn movements. Northbound traffic on US-20 has a protected/permissive left turn. Southbound traffic on US-20 has a protected left turn. Eastbound Hill Avenue has the same configuration with 2 thru lanes, 1 protected/permissive left turn only lane and a channelizing island separating thru and right turn movements. Westbound Hill Avenue has 1 thru lane, 1 thru/right turn lane, and 2 protected left turn lanes.

C. TRAFFIC VOLUMES

In 2013, the AADT for US-20 at this intersection was found to be 27,780 vehicles per day, approximately 740 (3%) of the total consisted of type B & C commercial vehicles. In 2011 an AADT for Hill Avenue west of the intersection with US-20 was found to be 9,050 vehicles per day, with 4,580 (51%) of the total consisting of type B & C vehicles. A 2009 AADT for east of the intersection on Hill Avenue was 13,090 vehicles per day.

D. CRASH DATA

YEAR	CRASHES
2011	26
2012	36
2013	24

CRASH SEVERITY	
69%	Property Damage Only
31%	Injury
0%	Fatal

PAVEMENT CONDITION	
73%	Dry
22%	Wet
3%	Ice
1%	Snow
1%	Not Stated

TYPE OF CRASH	
59%	Rear End
19%	Left Turn
9%	Sideswipe – Passing
6%	Angle
3%	Pedestrian
1%	Sideswipe - Meeting
1%	Pedalcycles
1%	Fixed Object
1%	Backing

TIME OF DAY	
72%	Day
28%	Night

CONTRIBUTING FACTOR			
57%	Following too Close	2%	Improper Crossing
12%	Improper Turn	2%	Driver Inattention
6%	Ran Red Light	1%	Improper Backing
5%	Failure to Control	1%	Unsafe Speed
5%	Improper Lane Change	1%	Reckless Operation
5%	Unknown	1%	Darting
2%	Failure to Yield		

E. COLLISION DIAGRAM

LUC-20-13.41
Intersection
2011-2013

LUC-20-13.41
US-20 (North Leg)
2011-2013

LUC-20-13.41
Hill Ave. (East Leg)
2011-2013

LUC-20-13.41
US-20 (South Leg)
2011-2013

LUC-20-13.41
Hill Ave. (West Leg)
2011-2013

F. PROBABLE CAUSES

The probable causes or deficiencies of this intersection were identified through a detailed analysis of the crash patterns, roadway conditions, existing traffic control, traffic volumes and traffic speeds.

We have identified possible safety items within the intersection as follows:

1. Clearance intervals within signal cycle may be too short, leading to an increased number of rear end and angle crashes. (39 Crashes)
2. Left turn crashes caused by drivers making improper turns, running red lights and failing to yield to those with the right of way. (13 Crashes)
3. Sideswipe crashes caused by improper lane changes and driver inattention. (6 Crashes)

G. HIGHWAY SAFETY MANUAL RESULTS

The HSM predictive method was applied to the study area to determine the potential for safety improvement. The results are as follows:

	Intersection: US-20 at Hill Avenue
Predicted Average Crash Frequency	4.9
Expected Average Crash Frequency	19.4
Expected Excess Crashes	14.5
Potential for Safety Improvement?	**Yes**

H. RECOMMENDED COUNTERMEASURES

Rear End & Angle Crashes – (56)

1. Investigate and optimize yellow and all red clearance intervals to reduce rear end and right angle crashes.
2. Ensure pavement markings and signage leading to intersection meet OMUTCD standards.
3. Test for skid resistance on approaches to intersection.
4. Complete progression/timing review.
5. Investigate altering left turn phasing.

Pedestrian & Pedalcycle Crashes – (3)

1. Investigate pedestrian clearance intervals.

I. PROJECT INFORMATION

Past Projects:

PID: 78395
Project Name: LUC US 20 12.40 Phase 2
Description: Mill 3 inches of asphalt and fill 3 inches of new asphalt with some pavement repairs between SLM 12.40 & SLM 14.36. Replace and/or repair existing curb, curb ramps and sidewalk. Perform necessary related work. This is an urban paving project where the district contributes 80% of the cost of the top 3 inches of asphalt. The City application for Safety funding ($720K) to upgrade signals has been approved between SLM 11.25 & SLM 16.61. Signal upgrade plans will be added to the resurfacing project plans.
Sale Date: 02-27-2007

PID: 84082
Project Name: LUC US 20 13.41 Greenhouse Row
Description: Construct pilot enhancement project that includes bioswales and which utilizes local plants; other enhancement features to be included as appropriate. A $495K earmark "Greenhouse Row (US-20)" is for the segment between Heatherdowns and Turnpike, and a $735K earmark "US-20 Southwyck Corridor Improvements, OH" is for the segment between Glendale and Hill. Perform necessary related work. See PID 89716.
Sale Date: 04-29-2009
Construction: May 2009 – August 2009