TRAFFIC SIGNAL SUBCOMMITTEE

Thursday, May 19, 2022

MINUTES

1. WELCOME AND INTRODUCTIONS

Mr. Bala Akundi (BMC) welcomed everyone, followed by a round of introductions.

2. REVIEW OF PREVIOUS MEETING NOTES

Mr. Akundi went over the minutes from the previous meeting on August 26, 2021. The minutes were approved without any modifications.

3. SIGNAL TIMING FOR VISION ZERO IN MONTGOMERY COUNTY

Mr. Kamal Hamud, Manager, Transportation Systems Engineering, provided an overview of Vision Zero policies and guidelines related to signal operations. Montgomery County is one of the first county governments in the United States to initiate a Vision Zero plan. The County has put resources in place to eliminate serious and fatal collisions on County roads for vehicle occupants (drivers and passengers), pedestrians, and bicyclists by the end of 2030. Mr. Hamud outlined several high-risk corridors where signal improvement countermeasures such as eliminating E/P left turns, implementing lead pedestrian intervals (LPI), installing backplates and checking clearance intervals were recommended. The county also installed 18 pedestrian hybrid beacons (PHB) and 12 rectangular rapid flashing beacons (RRFB). An additional 10 PHB's are under design.

[PowerPoint: Montgomery County Vision Zero Signal Improvements]

4. SIGNAL TIMING FOR PEDESTRIANS AND BICYCLISTS: HIGHLIGHTS FROM NCHRP REPORT 969

Dr. Burak Cesme, Kittelson & Associates, briefed the committee on new performance measures for pedestrians and cyclists based on the NCHRP Research Report 969. Traffic signal timing is traditionally developed to minimize vehicle delay at signalized intersections. This often results in degraded safety and mobility for pedestrians and bicyclists. This research developed new performance measures for pedestrians and cyclists and a toolbox of treatments at signalized intersections to improve pedestrian and bicyclist experiences by elevating safety considerations, reducing their delay, and enhancing accessibility.

It describes 2 performance measures and 28 unique treatments to make intersections friendlier for pedestrians and cyclists.

Pedestrian Delay: While pedestrian delay is an easy-to-calculate metric (especially when crossings are not two-stage) and should be one of the primary objectives in intersection design, it is often ignored. Not reporting pedestrian delay, if computed, can lead to situations where average intersection vehicle delay is as low as 20 seconds while average pedestrian delay is as high as 80 seconds (e.g., for actuated pedestrian crosswalks crossing a mainline).

High pedestrian delays also create an environment with increased safety challenges. The Highway Capacity Manual (HCM) 2000 indicates that when average pedestrian delay is larger than 60 seconds, a very high likelihood of non-compliance is anticipated. As a result, NCHRP Research Report 969 advises considering pedestrian delay as part of an intersection analysis along with vehicle delay (and average bicycle delay can be approximated by the pedestrian delay where bicycles follow a pedestrian phase). The simple action of reporting pedestrian delay raises the practitioner's awareness of intersection performance and as a result, can identify opportunities to improve the condition.

Lowest Pedestrian Speed Accommodated: Another metric included in this report is the lowest pedestrian speed accommodated for a given crosswalk. According to the Manual on Uniform Traffic Control Devices (MUTCD), a walking speed of 3.5 feet per second should be used to calculate pedestrian clearance time for pedestrians who begin crossing up to the last moment of the Walk interval. However, research that studied walking speed distribution among different age groups showed that about 8 percent of adults 60 and younger and 26 percent of adults older than 60 years old walk slower than 3.5 feet per second.

Intersection timing should meet the needs of most users by accommodating lower pedestrian speeds, thereby increasing intersection accessibility. To help agencies during signal timing development and incentivize timing plans that can accommodate lower walking speeds, NCHRP Research Report 969 provides methods to calculate lowest pedestrian speed accommodated at a signalized intersection as a way of quantifying accessibility.

[PowerPoint: Traffic Signal Strategies for Pedestrians and Bicyclists – NCHRP Report 969]

5. INRIX 2021 US SIGNALS SCORECARD

The INRIX 2021 U.S. Signals Scorecard expands upon the initial U.S. Signals Scorecard, the first and only systemic nationwide analysis of individual traffic signal performance. Mr. Rick Schuman, Vice President, INRIX, provided an overview, with a specific focus on Maryland and the Baltimore region. The report includes extensive analysis and performance metrics at the state and MPO level. It includes summaries such as the picture below.

MPO	Signals Analyzed	Est Vehicle Crossings/ Signal	Observed Crossings/ Signal	Arrival on Green (%)	Delay/ Vehicle (Sec)	Total Delay/ Signal (Hours)	CO_2 from Delay (Tonnes)	Oil from Delay (Barrels)
SCAG (Los Angeles)	***17,226***	23,001	617	60.5%	20.0	127.7	***7,030***	***18,311***
NYMTC (New York)	15,191	11,513	347	62.3%	23.1	74.0	3,593	9,357
CMAP (Chicago)	7,961	21,529	979	61.6%	18.2	108.7	2,766	7,205
MTC (San Francisco Bay Area)	7,290	14,808	332	59.9%	20.0	82.5	1,922	5,006
NCTCOG (Dallas/Ft. Worth)	5,986	19,962	971	61.4%	19.6	108.7	2,081	5,420
NJTPA (Northern New Jersey)	5,912	17,905	532	60.5%	18.9	93.8	1,773	4,618
DVRPC (Philadelphia)	5,577	17,599	586	59.7%	19.0	92.9	1,656	4,314
HGAC (Houston)	5,339	19,935	962	60.1%	21.3	118.1	2,016	5,250
SEMCOG (Detroit)	5,105	19,284	***1,491***	67.7%	15.2	81.4	1,329	3,462
NCR TPB (Washington, DC)	4,913	22,090	520	63.9%	19.5	119.6	1,878	4,893
MAG (Phoenix)	4,099	28,465	955	63.2%	18.5	146.0	1,913	4,983
DRCOG (Denver)	3,824	20,484	537	68.0%	15.9	90.5	1,106	2,881
PSRC (Seattle)	3,479	17,410	341	61.1%	19.7	95.1	1,057	2,754
ARC (Atlanta)	3,316	29,554	898	64.0%	21.0	172.6	1,830	4,767
Boston Region MPO	3,200	17,085	405	***56.6%***	22.2	105.5	1,080	2,812
Miami-Dade MPO	2,876	***30,253***	1,153	61.3%	***24.9***	***209.2***	1,924	5,011
SANDAG (San Diego)	2,755	18,539	450	59.6%	20.0	102.9	906	2,360
OKI RCOG (Cincinnati)	2,716	18,177	743	66.6%	16.0	80.9	702	1,830
Metropolitan Council (Twin Cities)	2,692	13,739	598	66.3%	14.9	56.7	488	1,271
Baltimore RTB	2,687	19,605	586	62.0%	19.9	108.3	931	2,424
EWCGOC (St. Louis)	2,318	21,933	1,005	68.6%	15.3	93.4	692	1,802
SPC (Pittsburgh)	2,242	14,912	708	62.4%	18.5	76.5	548	1,428
NOACA (Cleveland)	2,131	15,594	759	62.8%	16.8	72.6	495	1,288
PACTS (Portland, OR)	2,050	15,362	289	64.1%	17.3	73.7	483	1,257
MARC (Kansas City)	1,992	17,971	626	63.4%	15.5	77.5	493	1,285

[PDF: INRIX Signal Scorecard April update]

Mr. Ben Myrick, MDOT-SHA, provided a state/regional perspective on the report card. For the most part, the Maryland signal metrics track closely to the national numbers – 19,900 to 21,277 vehicles per intersection, 63.6% average arrival on green to 62.8%, 17.6 sec delay per vehicle to 19.0, etc. Mr. Myrick compared Maryland signal performance to Massachusetts (similar population, geographic area) and they too are fairly close (5001 signals in MD to 4,884 in MA, 63.5% arrival on green in MD to 57.4% in MA etc.). In other metrics, delay per vehicle increased from 2020 – from 17.6 seconds to 19.0 (US 16.9 sec to 18.3 secs). Midday has as much volume and delay as AM peak. The analysis also showed Saturdays as being very busy and the need to do more with signal timing on weekends.

Mr. Myrick made some general observations in conclusion – Baltimore City has the highest delay but performance is not bad compared to other cities. Harford and Frederick counties also seem to be having some performance issues. He suggested doing more timing reviews – especially with post-COVID changes and more focus on mid-day and Saturday.

[PowerPoint: BMC Maryland Signal Report]

ATTENDANCE:

Amy Lopez, INRIX
Andrew Burke, MWCOG
Bala Akundi, Baltimore Metropolitan Council (BMC)
Bailey Lozner, Kittelson & Associates
Ben Myrick, MDOT SHA
Bo Zhou, Anne Arundel County DPW
Breck Jeffers, FHWA
Edward Myers, Kittelson & Associates
Eileen Singleton, BMC
Hiwot Habtemariam, MDOT SHA
Kamal Hamud, Montgomery County DOT
Keith Riniker, Mead & Hunt
Kristen Haas, STV
Kristoffer Nebre, Baltimore County DPW&T
Mike Massaro, INRIX
Minseok Kim, MDOT SHA
Rick Schuman, INRIX
Robert Evans, Wallace, Montgomery & Associates
Roger Hale, TST
Seth Young, STV
Tina Fink, Toole Design
Vivek Hariharan, RS&H