

September 27, 2019

Jeffrey F. Paniati
Executive Director / CEO
Institute of Transportation Engineers
1627 Eye Street, NW, Suite 600
Washington, DC 20006

Dear Mr. Paniati -

The purpose of this letter is to transmit the finding of the Appeals Panel (“the Panel”) that met on August 28, 2019 to hear appeals on seven issues related to the proposed ITE Recommended Practice “Guidelines for Determining Traffic Signal Change and Clearance Intervals”. The Panel’s findings are contained in the attachment to this letter. Overall, the Panel agreed with the Appellants on some issues and with the Technical Committee that developed the Recommended Practice (“the Committee”) on others. Where we found for the Appellants, we have provided recommended actions for changes to the proposed Recommend Practice where possible.

The Panel recognizes that the proposed Recommended Practice is the result of several years of concentrated effort and notes that, overall, the formulas and other material contained in the proposed ITE recommended practice are already widely used and have proven to result in intersection operations that are safe, efficient, and practical. Several of the issues and much of the discussion at the Appeals Panel meeting centered around issues related to operation of red light enforcement cameras, which we believe is a related, but separate issue from the sound development of appropriate signal change and clearance intervals. We further recognize that the formulas and recommended values in the proposed Recommended Practice are based on average driver behavior and vehicle dynamics and cannot precisely account for all possible vehicles, drivers or situations, which is why the proposed Recommended Practice appropriately calls for use of local data, where available, and engineering judgement in the determination of signal change and clearance intervals.

We appreciate the opportunity to be of service to ITE in this important matter and would be happy to discuss or answer questions about these recommendations.

Sincerely yours,



Aleksandar Stevanovic, PhD, PE
Associate Professor
Department of Civil & Environmental Engineering
University of Pittsburgh
Pittsburgh, PA

Ed Smaglik

Edward Smaglik, PhD, PE
Associate Professor
Civil and Environmental Engineering
Northern Arizona University
Flagstaff, AZ



Gary Piotrowicz, PE, PTOE
Deputy Managing Director / County Highway Engineer
Road Commission for Oakland County
Beverly Hills, MI

Attachments – Appeals Panel Findings

cc: Bruce Belmore (ITE International President)
Jeff Lindley (ITE staff)
Douglas Noble (ITE staff)

Appeals Panel Decisions on Specific Issues

Item No. 1: Application to Turning Movements

Recommendation: The Panel finds for the Appellants. Evidence presented to the Panel is persuasive that application of the Kinematic Equation to turning movements in the same fashion as for through movements should be reconsidered by ITE.

Justification: The Panel believes that the Appellants introduced enough evidence to establish the case that the existing Kinematic Equation does not fully cover several dilemma-zone situations for left-turn and right-turn movements. However, the issue is quite complex and the changes to the Recommended Practice recommended by the Appellants to address this issue raise practicality and implementability concerns. Therefore, a recommended solution is not offered as this is beyond the scope of the Panel's responsibilities. The Panel suggests that this item be properly reconsidered by ITE. The resulting Recommended Practice should not stipulate 'one-size-fits-all' type of solution for this problem but rather recognize needs of diverse users and operational conditions.

Item No. 2: Estimated Value of Turning Movement Approach Speed

Recommendation: The Panel finds for the Appellant. The Panel recommends that ITE review and adopt (not necessarily verbatim but a version of a similar meaning) the text recommended by the Appellant (attached) in Section 2.14 "Left-Turn Movements" (page 34) and Section 3.6 "Application for Turning Movements Protected Left-Turn and Right-Turn Applications" (page 50).

Justification: The Panel believes that the stipulations recommended by the Appellant provide more flexibility for estimation of the Turning Movement Approach Speed than the current version of the Recommended Practice. The Panel believes that a Recommended Practice that includes multiple ways to estimate the Turning Movement Approach Speed will better serve a variety of users with different operational and geometric roadway characteristics.

Item No. 3: Estimate of Thru Movement Approach Speed

Recommendation: The Panel finds for the Committee. No further action is required on this item.

Justification: The current Recommended Practice states that the use of SL+7 may be used to estimate and substitute for 85th percentile speed if data is unavailable and a speed study is not conducted and covers all Speed Limits except 25mph. The Appeals Panel believes that this is a

reasonable Recommended Practice, and does not recommend adjusting the language to identify different conditions for different Speed Limits. Operating agencies are free to adjust this Recommended Practice as they see fit for local conditions.

Item No. 4: Enforcement Tolerances

Recommendation: The Panel finds for the Committee. The Panel does not believe a specific enforcement tolerance should be provided in the Recommended Practice as there is inadequate research to support a specific number. The Panel does, however, recommend that ITE place stronger language in the Recommended Practice that clearance intervals calculated using the Recommended Practices in the document should not be used to determine red light violations using red light enforcement cameras with zero tolerance.

Justification: The Recommended Practice is not intended to declare, at a snap shot in time, if a vehicle “has violated the red signal” and the use of this document and red light running enforcement should be at best loosely connected. Change intervals should be developed using variables that reflect average people and vehicles. Research has shown that using those values in the ITE formula reduces crashes while providing reasonable mobility. Change intervals are not designed to directly correlate with the exact requirements of red light cameras. Separate guidance on specific enforcement tolerances should be provided based on further study and research, not included as part of the Recommended Practice.

Item No. 5: DeGazis Quotation and Use of “Deceleration Rate” Term

Recommendation: The Panel finds for both the Appellant and the Committee. The Panel recommends that ITE drop the term ‘rate’ from ‘deceleration rate’ when used in the Recommended Practice. No action is recommended on the DeGazis quotation.

Justification: The use of ‘deceleration rate’ is misleading and technically incorrect; as such, the Panel believes the word ‘rate’ should be dropped when used in this context in the Recommended Practice. Regarding the DeGazis quotation, a clear and compelling case for changing the use of this quotation was not made by the Appellant.

Item No. 6: Definition of Intersection Width

Recommendation: The Panel finds for the Committee. The Panel does not recommend any change to the Recommended Practice regarding how to determine intersection width.

Justification: When factoring in the length of the vehicle, in most cases, this will extend the width of the intersection past the crosswalk. The appellant is requesting that intersection width

extend to the far side of the crosswalk on the far side of the intersection. The Recommended Practice specifically allows the change requested by the Appellant at the discretion of the operating agency. There is no research to support making the Appellants request the standard for all intersections.

Item No. 7: Minimum Value of Red Clearance Interval

Recommendation: The Panel finds for the Appellant.

Justification: Because the recommended lower bound of 1.0 seconds for red clearance was not based on a mathematic or kinematic process, nor is any justification noted in the proposed Recommended Practice, the Panel believes that there should be no recommended lower bound for red clearance.

ITE Proposed Recommended Practice, “Guidelines for Determining Traffic Signal Change and Clearance Intervals”

Text changes related to Issue 2

2.14 Left-Turn and Right-Turn Movements (pg 34)

Recommendation

...The preferred method for representing approach speed for the yellow change interval for protected left and right turns is to use the 85th percentile approach speed for turning vehicles as measured by a speed survey. This value should not be less than the posted speed limit unless a speed survey indicates a maximum approach speed in the turn lane less than the posted speed limit, in which case this maximum measured approach speed may be used if fully documented. The 85th percentile approach speed should be measured upstream of the intersection at the critical distance calculated for through movement vehicles or immediately upstream of the opening of the turn lane, whichever is closer. If the 85th percentile approach speed for the left-turn or right turn movement is unavailable and a speed study has not been conducted, the posted speed limit should be used ~~85th percentile approach speed for turning movements may be estimated and substituted for V₈₅ as the speed limit minus 5 mph (8 km/h) by the following equation~~ for calculating the yellow change interval. ~~interval:~~

$$\text{V}_{85E}(\text{turn}) = \text{SL} - 5 \text{ (U.S. units) (35)}$$

~~Where: V_{85E} = estimated 85th percentile speed (mph); and SL = posted speed limit (mph).~~

$$\text{V}_{85}(\text{turn}) = \text{SL} - 8 \text{ (Metric units) (36)}$$

~~Where: V_{85E} = estimated 5th percentile speed (km/h); and SL = posted speed limit (km/h).~~

3.6 Application for Turning Movements

Protected Left-Turn and Right-Turn Applications (page 50)

85th Percentile Approach Speed, V₈₅

The approach speed for the yellow change interval is the 85th percentile approach speed for left-turning and right-turning vehicles as determined under free-flow conditions, if known or as determined by a speed study. This value should not be less than the posted speed limit unless a speed survey indicates a maximum approach speed in the turn lane less than the posted speed limit, in which case this maximum measured approach speed may be used if fully documented. The 85th percentile approach speed should be measured on the intersection approach, at the critical distance calculated for through movement vehicles or immediately upstream of the opening of the turn lane, whichever is closer. If the 85th percentile approach speed for the turning movement is unavailable

and a speed study is not conducted, the posted speed limit should be used. ~~85th percentile approach speed for turning movements may be estimated and substituted for V85 as the speed limit minus 5 mph (8 km/h) by the following equation for calculating the yellow change interval.~~ interval:

$$V_{85E}(\text{turn}) = SL - 5 \text{ (U.S. units) (G)}$$

Where: V_{85E} = estimated 85th percentile speed (mph);
and SL = posted speed limit (mph).

$$V_{85E}(\text{turn}) = SL - 8 \text{ (Metric units) (H)}$$

Where: V_{85E} = estimated 85th percentile speed (km/h);
and SL = posted speed limit (km/h).