State of Wisconsin
Department of Transportation

Traffic Signal Design Manual

ORIGINATOR Director, Bureau of Traffic Operations	3-2-2
CHAPTER 3	Project Scoping Process & Geometric Design Considerations
SECTION 2	Capacity Analysis
SUBJECT 2	Basic Parameters for Capacity Analysis

GENERAL SIGNAL TIMING ANALYSIS PARAMETERS

Note: The Signal Timing Analysis Parameters are recommended guidelines for general analysis of state-owned signals. For analysis that is conducted to determine actual design parameters (such as turn bay lengths), contact the appropriate Region to check for additional regional guidance prior to submitting the analysis.

Minimum Green Times:
Mainline Through Phases (2 & 6) – 10 – 20 sec
Side Street Through Phases (4 & 8) – 7 – 10 sec
Mainline & Side Street Left Turn Phases (1,3,5,7) – 5 sec for single lanes, 8 sec for dual lanes.

Maximum Green Times – Isolated Signals:
Mainline Through Phases (2 & 6) – 35 – 60 sec
Side Street Through Phases (4 & 8) – 25 – 40 sec.
Note: At intersection of two STHs, on the lower volume STH a lower max time may be used.
Mainline & Side Street Left Turn Phases (1,3,5,7) – 15 – 25 sec.

Clearance Times:
Refer to TEOpS 4-2-5, Clearance Intervals.

Pedestrian Phase Times:
Walk Time – 7 sec.
Ped Clearance Time – [(Distance from curb to curb)/(3.5 ft/sec)].
Note: If it is known that Children or Elderly use the intersection, a walking speed of less than 3.5 ft/sec should be used.
Ped Check – Walk Time + Ped Clearance Time ≥ the amount of time it takes for a person walking 3 ft/sec to cross from the pedestrian detector to the far side of the traveled way being crossed. Any additional time that is required to satisfy this condition should be added to the Walk Time.

Isolated Signal Cycle Lengths:

Typically Range from 60 sec – 120 sec.

Coordinated Signal Cycle Lengths:
Typically Range from 80 sec – 130 sec.

Interchanges:
Typically Range from 100 – 130 sec.

GENERAL SIGNAL ANALYSIS REVIEW PARAMETERS

1. PHF – Verify that the correct PHF is used. % Heavy Vehicles – Verify that correct % Heavy Vehicles are used.

2. RTOR – Verify correct RTOR volume is used. RTOR are used only when an exclusive right turn lane is provided. RTOR for each approach **shall** be the lesser of (3600/cycle length) X 2 or ½ X hourly right turn volume. Use engineering judgment where circumstances dictate.

3. Arrival Type – For TEAPAC products; verify correct Arrival Type is used. Arrival Type 4 is used for coordinated approaches and Arrival Type 3 is used for approaches that aren't coordinated. Arrival Type 5 or 6 *should* not be used.

4. Ideal Saturation Flow Rate – Ideal Saturation Flow Rate used for left-turn and through movements **shall** be 1900. If any other Ideal Saturation Flow Rate is used it must be supported by a study performed in a comparable location, with similar characteristics, and same geographical area.

5. Phasing –Verify that sequence of operation (phasing) is correct for existing conditions and that changes to existing phasing for future conditions are reasonable and *should* take into account any necessary geometric changes. Split phasing on the mainline shall only be considered as last resort in extreme cases.

6. Lane Assignment – Verify that the existing/proposed lane configuration is appropriate and corresponds between the plan and sequence of operations sheets.

7. Turning movement Volumes – Verify that the input volumes used in the analyses are correct.

9. Left Turn Requirements – Verify that under existing or future conditions that left turn movements are accounted for by signal phasing. A protected/permitted or protected only left turn phase **shall** be considered in accordance with the Left-turn Conflict Analysis.

10. Coordinated Signal System Analysis – When signals are in a coordinated system and pedestrian phases are present, verify that minimum green time given to through phase is enough time to cross pedestrians curb to curb unless pedestrian actuation is used.