# Determination of Yellow Change and Red Clearance Intervals

## Yellow Change Interval

Yellow interval = \( t + \frac{v}{2a + 64.4g} \)

- **t** = perception reaction time, typically 1.5 seconds
- **v** = design speed*, in ft/sec
- **a** = deceleration rate, typically 11.2 ft/sec²
- **g** = grade

Round up to nearest 0.1 second.

Minimum yellow change interval is 3.0 seconds.

Hold stakeholder discussion** when calculated yellow change interval is longer than 6.0 seconds.

## Red Clearance Interval

Red interval = \( \frac{w}{v} \)  

- **w** = width of intersection, in feet
- **v** = design speed*, in ft/sec

If the initial calculation results in an all red time longer than 3.0 seconds, recalculate the red time as follows:

Recalculated red interval = \( \frac{1}{2} (\frac{w}{v} \cdot 3) + 3 \)

Round up to nearest 0.1 second.

Red clearance interval should be between 1.0 and 6.0 sec.

Hold stakeholder discussion** when recalculated red clearance interval is longer than 4.0 seconds.

## Notes

- Design speed is the speed limit unless a speed study determines that the 85th percentile speed is faster or intersection geometrics compel vehicles to traverse the intersection slower.

- The purpose of a stakeholder discussion is to provide advance notification and involvement to stakeholders and provide an opportunity to consider possible countermeasures.

- For most left turn lanes, assume a speed of 20 mph (32 kph) to 30 mph (48 kph). For locations with unusual conditions a higher or lower speed may be appropriate.

- For separate left turn phases, calculate yellow and red intervals.

- For left turns without a separate phase, calculate yellow and red times for both the through movement and the left turn movement. Use the highest yellow and enough red to equal the highest total time.

- Where existing times are higher than calculated times, use the calculated values unless there is a documented history of the need for higher times. If approach is high speed and existing times are significantly higher than the calculated times, use the calculated values but consider adding a note to the plan to direct field forces to reduce the time incrementally.

- Include in the note how much and how often to reduce time until the final value is reached. (Ex. Existing Yellow Change Interval for phase 2 may be decreased by 0.2 seconds per week until the required value is reached.)

- Red clearance interval should be between 1.0 and 6.0 seconds.

- Hold stakeholder discussion** when recalculated red clearance interval is longer than 4.0 seconds.

## Sources: