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The ITE (Institute of Transportation Engineers) [yellow change interval formula](#) calculates the duration of the yellow light. The flaw is not the formula itself. The flaw is how traffic engineers misapply the formula. The misapplications short the yellow light by several seconds. The misapplications adversely affect every intersection. Every driver, good or bad, is susceptible. These misapplications cause crashes, and within a few years the issuance of more red-light tickets than the city's population:

1. Traffic engineers use formula [CA MUTCD Table 4D-102](#), which is the ITE formula¹ universally, but the formula applies only to unimpeded through movements. The formula fails for turning or impeded movements.
2. Traffic engineers plug the wrong approach speed² (i.e., for turning lanes) into the equation.
3. Traffic engineers misapply stochastic methods. Engineers input perception-reaction time (1 s) and deceleration (10 ft/s²) which work only for the average passenger car driver. By using *average*, the engineer de facto forsakes half of driving population as well as all commercial drivers.
4. Traffic engineers omit the grade deceleration adjustment gG . Vehicles ascending or descending a hill require longer yellows than vehicles on a level road.
5. Traffic engineers omit the calculation of the tolerance of the yellow change interval. Engineers set the red-light camera grace period to around 0.3 seconds (less time than the blink of an eye), but the tolerance for a properly-applied formula exceeds 2.0 seconds. Currently 70% of camera revenue comes from vehicles entering intersections within 1 second of the light turning red.
6. Because traffic engineers misapply the physical and mathematical sciences to yellow change intervals, the change intervals violate [California Vehicle Code 21400](#) which requires conformance to the [CA MUTCD](#). [CA MUTCD 4D.26\(3\)](#) requires change intervals to be determined by engineering practices. The formula in Table 4D-102 is not an engineering practice¹ because it misapplies physics and math as enumerated by 1 thru 5 above. [California Engineering Practice Act 6701](#) defines a professional engineer as one who applies, not misapplies, the physical and mathematical sciences.

Solution: <http://talussoftware.com/download/yellow-change-intervals> Video: <https://youtu.be/N1Fle9TB8FE>

¹Engineers invoke the name of the "federal guidelines" to justify the ITE formula. The ITE formula, however, is not a federal standard, guideline or ITE Recommended Practice. Options and guidelines are used at the engineer's discretion. ²Engineers often invoke [CA MUTCD 4D.26\(14\)](#) to justify a 3-second yellow for any approach speed. However, 4D.26(14) states the 3-second yellow is a minimum to be used only for slower approaches. Slower approaches are 25 mph speed limit or less in consonance with the ITE formula. For turning and impeded motions, the ITE formula always shorts a yellow by several seconds, that according to the laws of physics.