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The Flaw in the Formula. The ITE (Institute of Transportation Engineers) [yellow change interval formula](#)¹ calculates the duration of the yellow light. The flaw is not the formula itself. The flaw is traffic engineers' misapplying 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 county's population:

1. Traffic engineers use the formula universally but the formula works only for one special case².
2. Traffic engineers plug the wrong approach speed² into the equation.
3. Traffic engineers misapply stochastic methods. Engineers input perception-reaction time and deceleration values for the average passenger car driver. By using *average*, the engineer de facto forsakes half of driving population as well as all commercial vehicle drivers.
4. Traffic engineers misapply an analytic solution to a physical solution. Engineers misapply grade term Gg to uphill traffic.
5. Traffic engineers omit the calculation of the tolerance of the yellow change interval. Engineers usually set the red-light camera grace period to less than 0.3 seconds (less time than the blink of an eye), but the tolerance for a properly-applied formula exceeds 2.0 seconds. 70% of camera revenue comes from vehicles entering intersections within 1 second of the light turning red.

New York Specific

6. Because traffic engineers misapply the physical and mathematical sciences to yellow change intervals, the change intervals violate [NY Vehicle and Traffic Law, Title VIII, Article 44, §1680](#). The intervals neither conform to the federal Manual of Uniform Traffic Control Devices (MUTCD) nor to the NY MUTCD supplement. [MUTCD 4D.26\(3\)](#) mandates (a *standard*) change intervals to be determined by engineering practices. New York Professional Engineers [Guideline 1](#) defines engineering practice as the application (not misapplication) of the physical and mathematical sciences. These misapplications of physics and math systematically harm, not safeguard, the public's life, health, property and welfare. This NY professional engineer's guideline decides an engineer's misconduct.

¹Engineers invoke the name of the "federal guidelines" to justify using the ITE formula. The ITE formula, however, is neither a federal standard nor guideline. The formula is only an indirect reference of an *option* in the Manual of Uniform Traffic Control Devices (MUTCD). As an option, engineers use the formula at their own discretion and personal liability. The ITE formula is not even an ITE Recommended Practice. (MUTCD's guidance, support and option statements are all discretionary.) ²The formula does not work for turn lanes. Also without considering speed limit, engineers invoke guidance MUTCD 4D.26(14) to set yellows to 3 seconds for all left *turn* lanes. But ITE 2016 Handbook and NCHRP 731 forbid a 3-second left yellow. Physics and experiment prove that from a speed limit of 45 mph, it takes the average driver over 6 seconds to turn left.