



Ceccarelli PE

Expert in Traffic Engineering as Applied to Photo & Police Enforcement

The Legal Breadcrumbs

1. North Carolina red-light camera statute [NCGS § 160A-300.1 \(c1\)](#) explicitly requires that the yellow change interval must comply with the *Manual of Uniform Traffic Control Devices* (MUTCD).
2. The [MUTCD ed 11 § 4F.17\(03\)](#) requires that the yellow change interval must be determined by *engineering practices*. It is [§ 4D.26 \(03\)](#) in older MUTCD editions.
3. North Carolina's Engineering Practice Act [NCGS 89C-3\(6a\)](#) defines an *engineering practice* as the *application of the mathematical and physical sciences*. This [definition](#) is also in dictionaries and encyclopedias.
4. North Carolina's DOT (and all DOTs in the USA) use the Institute of Transportation Engineer's (ITE) formula to calculate the yellow change interval.
5. Because the [ITE formula](#) is *misapplications*, not applications, of the mathematical and physical sciences, the formula is not an engineering practice. It is engineering *malpractice*. One cannot declare that $2 + 2 = 5$ is an engineering practice.
6. Using the ITE formula to determine yellow change intervals violates many laws: the 1) state engineering practice law, 2) the state law which adopts the MUTCD as law -- [NCGS § 136-30\(d\)](#) and violates 3) [23 CFR 655.601 Subpart F\(a\)](#) which is the MUTCD. All DOTs use this formula and have been for decades. The formula is the reason the red-light camera industry exists and reason behind 90% of the crashes we see.
7. The difference between Isaac Newton's physics of motion $t = v/a$ and the ITE yellow change interval formula ($t = v/2a$), the "2" being problematic, combined with the data analysis of raw red-light running events in Cary, North Carolina, reveal that 90% of all red-light running is caused by the formula. I estimate 9999 out of 10,000 are framed by the formula and that 1 actually may be a result of a bad driver. The solution is to give drivers the time to stop, not just the distance to stop.
8. ITE never states that its yellow change interval formula is an engineering practice. ITE puts an explicit disclaimer upon its accuracy.



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Justifications and Rebuttals to Using the ITE Formula

1. All DOTs use it.
 - a. Everyone saying the $2 + 2 = 5$ does not make $2 + 2 = 5$.
 - b. Frequency of use does not imply validity.
2. The ITE formula is a standard of care.
 - a. Incorrect! It is true that DOT's adopt the ITE formula as a standard. But the formula is a standard of *practice*. It is *not* a standard of *care*. To be a standard of care, the standard has to first rise to the bar of an engineering practice. The formula is misapplications of the mathematical and physical sciences. $2 + 2 = 5$ does not rise to any engineering standard of care.
 - b. The standard of care in the 14th century was that doctors used leeches to lower a fever.
3. I have been using the formula for all my career.
 - a. Frequency of use does not imply validity.
 - b. I frequently eat candy bars. That does not mean it is good for me.
4. The formula works. I don't see any crazy movements when vehicles approach an intersection.
 - a. Seeing crazy movements at every light cycle is irrelevant. Yet we do see some crazy movements often, like "beat the light", which the formula requires.
 - b. To reveal the scope of the problem, it takes science.
 - c. When I look up at the night sky, I see stars going from east to west. Clearly the earth is at the center of the universe, and the universe revolves around the earth. Mankind believed this for thousands of years, then along came Nicolaus Copernicus.
 - d. Mankind thought red-light running was caused by bad driving, then along came red-light cameras. A city issues more tickets than its population in a few years. Is everyone a reckless driver? ITE's math in conflict with physics shows that drivers are not the problem. The math is.



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5. The MUTCD says the yellow should be between 3 and 6 seconds.
 - a. Irrelevant. If spoken in a court, this statement is perjury. It is not the whole truth.
 - b. The MUTCD has 4 groups of statements: Standard, Guidance, Option and Support. MUTCD describes their applicability in [§ 1C.01 \(01\)](#). The only rule a DOT must abide by is a **standard** but even standards have exceptions. In the end, the professional engineer has authority over a standard but he better be well-justified in modifying one.
 - c. [MUTCD § 4F.17 \(13\)](#) says that the 3 to 6 second statement is guidance. Guidance, options and support statement exist because what they say does not apply all the time or there is serious disagreement within the engineering community.
 - d. Yellow change intervals are determined by engineering practices is a MUTCD **standard** requirement. MUTCD § 4F.17 (03)
 - e. It should be noted that the latest edition (ed 11) of the MUTCD has removed any references to ITE. ITE has been demoted. The previous edition, MUTCD 2009 Rev 3 July 2022, mentions as a support statement that ITE had “engineering practices” [§ 4D.26\(07\)](#).
6. We are following the federal *guidelines*.
 - a. No they are not. The federal government dropped the ITE formula.
 - b. In any case, “guidelines” never carry authority. Only standards do.
 - c. A professional engineer blaming his errors on federal guidelines is unprofessional.
 - d. A licensed professional engineer blaming his errors on anybody else is unprofessional—and unlawful.
 - e. A licensed professional engineer is responsible for the work he does.
 - f. The licensed professional engineer is powerful.
 - g. The licensed professional engineer tells the government what to do, not vice-versa. If he uses a faulty formula, the professional engineer is responsible. His employer may share liability, but the PE is responsible.



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- h. The professional engineer cannot point his finger of blame at the federal guidelines, ITE, the State DOT standard of practice or his colleagues. A professional engineer cannot go shopping at Walmart, purchase a yellow signal light, erect it at the corner of Walnut and Meeting Place, and blame its improper operation on Walmart. He cannot legally claim, “the devil made me do it”.
- i. The engineer has authority over a standard. If the standard is wrong, the engineer has the obligation and authority to revise the standard.
- j. “I am just using the federal guidelines”, makes it appear that the engineer is appealing to a higher authority. Unlike laws that fall under the US Constitution’s Article VI Supremacy Clause, the engineering habits of federal agencies have no authority. The federal government delegated engineering authority to the States (the MUTCD).
- k. Many federal agencies, including the FHWA, do a poor quality of work. The federal government has not established engineering statutes like States have done. States’ statutes are what hold engineers personally accountable to get the math right. States’ engineering statutes transcend the engineer’s employer. Those obligations to the engineering statutes are attached to the engineer and foillow him throughout his career. Disobeying the statutes means civil or criminal penalties and/or revoking of his license.
- l. There is contention between States’ boards of engineers and the chaos performed by federal agencies. Claiming “I follow the federal guidelines” has a negative connotation.



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Manual of Uniform Traffic Control Devices

Is the MUTCD a standard of care? Yes. The answer comes with the proviso of understanding what the MUTCD is.

1. The Federal Highway Administration (FHWA) publishes the MUTCD.
2. The purpose of the MUTCD is to ensure that traffic signals, traffic signs and other traffic control devices look the same throughout the United States. For example, “a stop sign is a red octagon”.
3. The MUTCD is a *Systems Requirements Specification (SRS)*. “SRS” is an engineering term. The acronym “SRS” speaks volumes in the technical world but its full meaning is initially hidden to attorneys. SRSes are used in all disciplines of engineering.
4. The SRS MUTCD defines a “standard”, a “guidance”, a “option” and a “support” statement within the MUTCD.
5. “Standard of care” is a legal term. This term has a definition independent from the MUTCD. “Standard” in standard of care has a different meaning than a MUTCD “standard”.
6. As a standard of care, the MUTCD is a moving target. The MUTCD changes every other year.
7. A licensed professional engineer has the power to deviate from the MUTCD.
8. A licensed professional engineer is legally obligated to do the right thing regardless what the MUTCD says.
9. Many States have a [supplement](#) to the MUTCD that overrides the federal MUTCD. Some of these supplements are shady. They attempt to legally conceal a State’s engineering mistakes.
 - a. For example, many red-light camera States have a MUTCD supplement provision that overrides the MUTCD-standard *Photo Enforced* sign:



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MUTCD is on the left. Some states have the sign on the right. Some states have the sign on the right without a supplement.

- b. Is using the sign on the right lawful? No. With or without the supplement, the sign on the right is bad. It is stupid (outside the engineering standard of care) to place a *picture* of a traffic signal next to a traffic signal.
- c. Then why does the “Photo Enforced” sign on the right exist in the first place?
 - i. The red-light camera company does not know the MUTCD.
 - ii. The red-light camera company makes up stuff.
 - iii. The red-light camera company does not have real engineers.
 - 1. The red-light camera companies are not licensed to practice engineering.
 - 2. Red-light camera companies do not have licensed professional engineers drafting red-light camera installation plans.
- d. Why does a State add to its MUTCD supplement a provision that allows for the sign on the right?
 - i. Because the state already has red-light camera installations with the wrong sign. Instead of replacing the sign, the State changes the law.
 - ii. I have experienced that when a DOT makes errors, instead of correcting the errors, the DOT changes the law to allow its errors. It is a way for DOTs to sweep their far-and-widely implemented mistakes



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under the rug in order to avoid liability. In 2010, *Ceccarelli v Town of Cary*, started out with the NCDOT doing this.

At this moment (June 2026), the NCDOT is doing it again. The NCDOT has introduced a bill ([H189](#)) to allow it to continue miscalculating its yellow-change intervals. The NCDOT expects me to be thankful.

10. Many a red-light camera court case was lost because attorneys take the MUTCD out of context.
11. The most common mistake is elevating the MUTCD *guidance* statement “the yellow light should be 3 to 6 seconds” to a MUTCD standard: “the yellow light *shall be* 3 to 6 seconds”. There is big difference between “should be” and “shall be”. It is the difference between a guidance and a standard statement.

Attorneys incorrectly argue that the 3 second yellow follows the MUTCD and therefore the DOT’s 3 second yellow is justified. Not only is the 3 second yellow just a guidance statement, but also the guidance statement itself requires that faster speed limits require longer yellows. Not every yellow can be the minimum 3 seconds.

12. On top of promoting MUTCD guidance to MUTCD standard, attorneys further promote the standard to the legally obligatory “standard of care”. It is a double mistake. Court case after court case, I have seen attorneys fooled by this mistake.
13. The MUTCD **standard**, that if adhered to by DOTs, would make red-light cameras go away is MUTCD 4F.17 (03). Yellow change interval must be determined by engineering practices. Engineering practices are defined at the state level. An engineering practice is not defined by what an engineer does (like go to the bathroom), but starts off with the “application of the mathematical and physical sciences”. If the ITE formula was an engineering practice, then there would no red-light cameras.