

June 25, 2014

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North Carolina Board of Examiners for Engineers and Surveyors
4601 Six Forks Rd, Suite 310
Raleigh, NC 27609

Dear Board of Engineers,

Last year I wrote a letter to you regarding the physics error in the yellow light duration calculation used by engineers in the State of North Carolina. It is a physics error which I believe to be responsible for most of the crashes at signalized intersections for the last 50 years. It is a physics error I know to be responsible for over 90% of red light running in North Carolina and the subsequent harvesting of tens of millions of dollars from innocent motorists under zero-tolerance red light camera enforcement.

Under your complaint procedures, there is no mechanism by which I can launch a complaint against a methodology practiced by a whole profession. NCBELS only has a procedure to launch a complaint against a single engineer. The latter being the case, I believe that the Board decided not to take action on the former. I was not following standard procedure. After this decision I talked to Andrew Ritter. Mr. Ritter told me to pick a handful of traffic engineers and submit a notarized complaint for each. That would legally initiate an investigation. So that is what I am doing today. Here are the [complaints](#).

It has been a year and important events have since happened. These events establish the truthfulness of what I am telling you with authority higher than my own.

1. One of the inventors of the [yellow light formula](#) (the formula NC engineers use) is still alive. Dr. Alexei Maradudin. Dr. Maradudin is the *highest* authority in this matter. He is currently a physics professor at [UC Irvine](#). Dr. Maradudin has verified all my conclusions. Raleigh's ABC Channel 11 [interviewed](#) him. Maradudin also wrote a [letter](#) enumerating the various ways that traffic engineers nation-wide misuse his formula.
2. I found a peer-reviewed [paper](#) in ASCE's Journal of Transportation Engineering, written by Dr. Chiu Liu at CalTrans. Dr. Liu confirms my exact same conclusions and offers the exact same solution. This should not come as surprise because physics is an open book. I was not the first person to knock at the door.
3. This London-based journal for traffic engineers, [Traffic Technology International](#), published Dr. Joseph Shovlin (PhD Physics) and my article in the Oct/Nov 2013 issue. It is the cover story.
4. Johnnie Hennings, P.E. (BSME), one of my witnesses, created animations illustrating the problem. 30 seconds of animation [here](#), [here](#), [here](#) and [here](#) are worth 17 pages of [derivation](#).

There are two primary reasons for my complaining:

1. The physics error causes crashes, even deaths.
2. The red light camera vendors for Raleigh, Wilmington and potentially [Fayetteville](#) in the near future exploit the physics error for profit. Many other cities in North Carolina have profited in the past. I estimate that North Carolina cities issued over 700,000 tickets.

I know it is customary that NCBELS interviews peers in the field to gauge the engineer under investigation. In this case that is going to be a problem. The peers are just as guilty. As a profession they all make the same mistakes. In my complaint I explain what you can expect to hear in section "The Engineer's Cathedral of Assumptions." I exhort you that when you listen to their arguments, adhere to the fundamentals of engineering. Engineering practice is the application of the mathematical and physical sciences, not the application of an institute's methodologies. The science under question is basic: $a = dv/dt$. But the NCDOT spec is $a = dv/(2 \cdot dt)$. Be keenly aware that there are three opposing goals of traffic signal design: 1) *efficient* traffic flow, 2) traffic *safety* and 3) *legality* of traffic movement. You will discover that 1 and 2 occur at the sacrifice of 3.

Why hasn't a Board of Engineers heard this problem in the past? Why are you the lucky ones?

1. Believe it or not, it takes a red light camera system to expose the problem. Without these systems running 24/7 tallying precise counts, catching every violation down to a tenth of a second, slapping expensive tickets upon entire city populations, this problem would probably have gone unnoticed for another 100 years.
2. It takes a person who has gotten flashed by a red light camera one too many times to bestow upon him the necessary incentive.
3. It takes a physicist flashed by a red light camera to understand the problem. "Geez. That yellow light did not adhere to Newton's Second Law."
4. It takes a person who has exhausted his faith in the legal system. I took this issue to Wake County Superior Court, but in hindsight I was naïve. The courtroom is simply not the venue to discuss physics. Truth is not the court's goal; culpability is. The Town of Cary did not create the problem it exploited, the professional engineers did. I should have went to you first. This is first an engineering problem. The problem just spills into the legal world.

I seem to be the unfortunate soul who meets all the criteria. You get lucky because I live here.

I have come to know dozens of people across the America and Canada who have gotten red light camera tickets. They are all very angry. They have good reason to be. Most folk unfortunately lack the knowledge of the mathematical and physical sciences to understand what really happened to them. These people have found good reasons to complain, namely reasons political and legal, but these

reasons are not the reasons they got flashed to begin with. The problem originates with bad engineering.

I come to NCBELS because NCBELS is the proper authority to handle this matter. NCBELS has the intelligence to understand the physics problem and the legal authority to affect a remedy. NCBELS bridges the gap between engineering and law enforcement. NCBELS needs to tell the traffic engineering profession to get it right and inform law enforcement to grant the public the required tolerance demanded by the engineering. I get more into this in the complaint.

I and my colleagues have gone to the traffic engineering community and the traffic engineering community blows us off. It reminds me of a quote from Upton Sinclair, "It is difficult to teach a man something especially when his salary depends on him not understanding it." For a traffic engineer to confess his guilt means a confession that he has contributed to thousands of injuries and has enabled cities to defraud the public out of hundreds of millions of dollars.

Up front you should know that the NCDOT engineers have the authority ([NC MUTCD Section 1A.07](#)) to remove red light cameras (a traffic control device), an authority which traffic engineers are unaware. In legal depositions we have taken of traffic engineers, engineers admit that engineering changes caused permanent dramatic increases in red light running but at the same time wash their hands of cities' penalizing drivers for those changes.

Thank you again for helping me in this matter.

Sincerely,

Brian Ceccarelli