



Confessions of a recovering engineer

By Charles Marohn

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Road widening is what engineers are taught to do for safety. Problem is, it makes things more dangerous



Photo: WSDOTCross-posted from Strong Towns.

After graduating from college with a civil engineering degree, I found myself working in my home town for a local engineering firm doing mostly municipal engineering (roads, sewer pipe, water pipe, storm water). A fair percentage of my time was spent convincing people that, when it came to their road, I knew more than they did.

And of course I should know more. First, I had a technical degree from a top university. Second, I was in a path towards getting a state license (at the time I was an engineer in training, the four-year "apprenticeship" required to become a fully licensed professional engineer), which required me to pass a pretty tough test just to get started and another, more difficult, exam to conclude. Third, I was in a profession that is one of the oldest and most respected in human history, responsible for some of the greatest achievements of mankind. Fourth -- and most important -- I had books and books of standards to follow.

A book of standards to an engineer is better than a bible to a priest. All you have to do is to rely on the standards. Back in college I was told a story about how, in WWII, some Jewish engineers in hiding had run thousands of tedious tests on asphalt, just to produce these graphs that we still use today. Some of our craft descends from Roman engineers who did all of this a couple of millennia ago. How could I be wrong with literally thousands of years of professional practice on my side?

And, more to the point, what business would I -- let alone a property owner on a project I was working on -- have in questioning the way things were done? Of course the people who wrote the standards knew better than we did. That is why they wrote the standard.

When people would tell me that they did not want a wider street, I would tell them that they had to have it for safety reasons.

When they answered that a wider street would make people drive faster and that would be seem to be less safe, especially in front of their house where their kids were playing, I would confidently tell them that the wider road was more safe, especially when combined with the other safety enhancements the standards called for.

When people objected to those other "enhancements", like removing all of the trees near the road, I told them that for safety reasons we needed to improve the sight distances and ensure that the recovery zone was free of obstacles.

When they pointed out that the "recovery zone" was also their "yard" and that their kids played kickball and hopscotch there, I recommended that they put up a fence, so long as the fence was outside of the right-of-way.

When they objected to the cost of the wider, faster, treeless road that would turn their peaceful front yard into the viewing area for a drag strip unless they built a concrete barricade along their front property line, I informed them that progress was sometimes expensive, but these standards have been shown to work across the state, the country, and the world, and I could not compromise with their safety.

In retrospect I understand that this was utter insanity. Wider, faster, treeless roads not only ruin our public places, they kill people. Taking highway standards and applying them to urban and suburban streets, and even county roads, costs us thousands of lives every year. There is no earthly reason why an engineer would ever design a 14-foot lane for a city block, yet we do it continually. Why?

The answer is utterly shameful: Because that is the standard.

In the engineering profession's version of defensive medicine, we can't recommend standards that are not in the manual. We can't use logic to vary from a standard that gives us 60 mph design speeds on roads with intersections every 200 feet. We can't question why two cars would need to travel at high speed in opposite directions on a city block, let alone why we would want them to. We can yield to public pressure and post a speed limit -- itself a hazard -- but we can't recommend a road section that is not in the highway manual.

When the public and politicians tell engineers that their top priorities are safety and then cost, the engineer's brain hears something completely different. The engineer hears, "Once you set a

design speed and handle the projected volume of traffic, safety is the top priority. Do what it takes to make the road safe, but do it as cheaply as you can." This is why engineers return projects with asinine "safety" features, like pedestrian bridges and tunnels that nobody will ever use, and costs that are astronomical.

An engineer designing a street or road prioritizes the world in this way, no matter how they are instructed:

1. Traffic speed
2. Traffic volume
3. Safety
4. Cost

The rest of the world generally would prioritize things differently, as follows:

1. Safety
2. Cost
3. Traffic volume
4. Traffic speed

In other words, the engineer first assumes that all traffic must travel at speed. Given that speed, all roads and streets are then designed to handle a projected volume. Once those parameters are set, only then does an engineer look at mitigating for safety and, finally, how to reduce the overall cost (which at that point is nearly always ridiculously expensive).

In America, it is this thinking that has designed most of our built environment, and it is nonsensical. In many ways, it is professional malpractice. If we delivered what society asked us for, we would build our local roads and streets to be safe above all else. Only then would we consider what could be done, given our budget, to handle a higher volume of cars at greater speeds.

We go to enormous expense to save ourselves small increments of driving time. This would be delusional in and of itself if it were not also making our roads and streets much less safe. I'll again reference a 2005 article from the APA Journal showing how narrower, slower streets dramatically reduce accidents, especially fatalities.

And it is that simple observation that all of those supposedly "ignorant" property owners were trying to explain to me, the engineer with all the standards, so many years ago. When you can't let your kids play in the yard, let alone ride their bike to the store, because you know the street is dangerous, then the engineering profession is not providing society any real value. It's time to stand up and demand a change.

It's time we demand that engineers build us Strong Towns.

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<http://www.grist.org/article/2010-11-22-confessions-of-a-recovering-engineer>