We live in a competitive world. Streets are a billboard advertising community values. Every design choice we make can make it better or worse.

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ETHICS

Engineers[1], landscape architects[2], and planners[3] have an ethical obligation to develop transportation and public realm solutions that improve the safety, health, and welfare of the public. While we work with these goals in mind, too many projects fail to deliver these outcomes in practice. Our industry has become too reliant on implementing solutions that meet "minimum standards" without sufficiently considering larger impacts of each design decision we make.

Professional licensure is used within each profession to establish an ethical code of conduct to guide our decision making and protect against poor business practices and corruption. While corruption and poor business behaviors are easy to identify, we often don't think about the way in which ethics apply more closely to our day-to-day work. We face ethical choices and trade-offs every time we make design and operational decisions related to safety or mobility on our roads.

Each year since the 1930s, tens of thousands of people have died on our roadways while hundreds of thousands more have been injured—a streak that has cost our society over $850 billion annually.

Too many of our roadways are dangerous by design.[4]

While our profession works to ensure safety is a paramount consideration in all design and operation decisions, the results show our profession must do better. Each year since the 1930s, tens of thousands of people have died on our roadways while hundreds of thousands more have been injured—a streak that has cost our society over $850 billion[5] annually. While these death and injury statistics are staggering, they do not include health and environmental costs associated with the transportation sector, which is now the single the largest source of greenhouse gas emissions[6].

This reality is due in large part to standard engineering practices, standards, and guidelines that prioritize motorist mobility over the safety, health, and welfare of local communities.

Most practitioners don't realize that the bulk of our funding structures, design guidance, and standards were developed in a time—between the 1940s and the 1980s—when creating an auto-centric society was a national priority. Because our design standards are iteratively updated, and assumed to be safety based, blind application of minimum standards today can result in the preservation of the auto-centric status quo and fail to improve the safety, health, and welfare of the public.

The two most fundamental documents of the transportation profession - the MUTCD and AASHTO *Green Book* – are both written to assume motorist mobility is a default priority over all other users. For example, the MUTCD states "it is desirable to have at least two lanes for moving traffic on each approach to a signalized intersection" to ensure "adequate capacity" is provided, yet it has no corresponding preference to provide sidewalks, crosswalks, pedestrian signal heads or bicycle lanes.

Similarly, AASHTO states "Appropriate accommodation of pedestrian travel is a major consideration in roadway planning and design. Because of the demands of vehicular traffic in congested urban areas, it is often very difficult

1 https://www.asce.org/code-of-ethics/, https://www.ite.org/pub/?id=e1bb9395%2D2354%2Dd714%2D51c8%2D36f82bef9364, and https://www.nspe.org/resources/ethics/code-ethics

2 https://www.asla.org/ContentDetail.aspx?id=4276

3 https://www.planning.org/ethics/

4 https://smartgrowthamerica.org/dangerous-by-design/

5 https://www.pbs.org/newshour/nation/motor-vehicle-crashes-u-s-cost-871-billion-year-federal-study-finds

6 https://www.epa.gov/transportation-air-pollution-and-climate-change/carbon-pollution-transportation

to make adequate provisions for pedestrians. Yet provisions should be made."[7]

In both of these critical engineering documents, the assumption is that accommodating pedestrians, transit users, and bicyclists is nice to do when space and budget allows but providing accommodations to minimize motorists delay is required.

Our standards and best practices allow the design of dangerous roads. Then when users get hurt, we blame the user.

All engineered products have two key groups of actors–the system designers and the system users. We have always known humans will make mistakes and, at times, use poor judgment. To reduce the likelihood of injury or death, most engineering disciplines incorporate the assumption of human failure into the system design to prevent these failures from resulting in death or injury[8].

This approach has not been applied within the transportation profession, which puts a disproportionate amount of the responsibility for safety on the system users, not on the system designer. The National Highway Traffic Safety Administration claims that "94% of crashes are due to human error,"[9] ignoring the contributing factors of road design and designer choices. Pick up any newspaper and you'll see this assertion repeated in the form of crashes described as accidents where user responsibility is the focus.

Road design should not place the entirety of the burden of safety upon the road users. Human error is inevitable; fatalities should not be.

While we are increasingly focusing on improving roadway safety in our industry, we rarely discuss how ethics should inform the design choices and trade-offs choices we have to make to retrofit existing roadways. While society's priorities are politically defined through project and funding decisions, our profession's priorities are defined by the design guidance we develop and the individual design decisions that we make—both of which are day to day actions which are fully within our control and independent from political priorities.

The following examples describe common decisions we make which put people in harm's way while they simultaneously meet our industry's "best practices standards":

- We allow motorists to turn left across multiple lanes of 45-mph traffic at traffic signals to minimize delay, knowing their risk of death in a side-impact crash is over 90%[10]
- We require pedestrians to cross 7-lane streets with 30 mph or faster traffic speeds to access a bus stop without benefit of a traffic signal, knowing their risk of death if struck is over 75%[11]
- We design roadways without bicycle lanes, shoulders, lighting, or safe crossing opportunities in urban areas despite the fact data shows 71% of pedestrian and bicyclists fatalities occur at night[12] (with 74% of all fatalities occurring in urban areas)

We know the dangers involved in these instances, yet these choices can be deemed to be competently made decisions because they comply with accepted standards and practices. The implication is that user deaths, despite being plainly inevitable, are the result of user mistakes.

But the people operating in these environments often do not have a voice in the decision-making process, and it is quite possible

7 *AASHTO. A Policy on Geometric Design of Highways and Streets. 2018.*

8 *https://www.cpsc.gov/Recalls*

9 *https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812115*

10 *https://www.researchgate.net/publication/304529995_Exploration_of_Vehicle_Impact_Speed_-_Injury_Severity_Relationships_for_Application_in_Safer_Road_Design*

11 *https://aaafoundation.org/impact-speed-pedestrians-risk-severe-injury-death/*

12 *http://pedbikeinfo.org/factsfigures/facts_safety.cfm*

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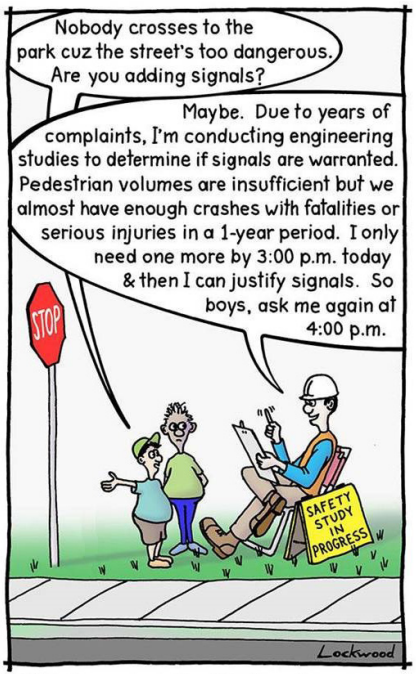
> ***The transportation design profession must accept increased personal responsibility for the outcomes of our work. It will be challenging, but it is our ethical duty to hold paramount the safety, health, and welfare of the public while we solve mobility challenges for all users of the roadway.***

that they do not understand the elevated risk they have in these environments.

We need a new approach to ethics. Our existing standards are inadequate, but they are not preventing us from building safer roadways. We are always allowed to do more than just meet the standards. What is missing is a values-based decision-making process that is centered on ethics, empathy, and equity.

If we are to reduce roadway deaths, we must actually follow our ethical code to hold paramount the safety, health, and welfare of the public and consider all users of the roadway. We have to view it as unethical to prioritize one person's mobility over another person's safety and to blame users when they get hurt doing what infrastructure invites them to do. We need to place a premium on acting with empathy and working toward equity.



This mindset shift is leading to change in European countries which are focusing on the application of systemic safety principles. Many U.S. cities and State Departments of Transportation are now adopting this vision under the umbrella of Vision Zero or Towards Zero Deaths. For the United States to achieve results like what Sweden is seeing, the transportation design profession will have to accept increased personal responsibility for the outcomes of our work.

This responsibility includes an ethical obligation to understand past unethical behavior of our industry which continues to have present day consequences. While the transportation profession didn't create the redlining that prevented black families from moving into white suburban communities in the 1950s and 1960s[13], it did build the highways that connected suburbs to cities—highways which were often purposefully built through urban black neighborhoods to destroy the lives of the residents and businesses without fair compensation for the loss. Our industry designed unsafe, high-speed roadways through cities to favor suburban commuter needs over the safety and health of the residents.

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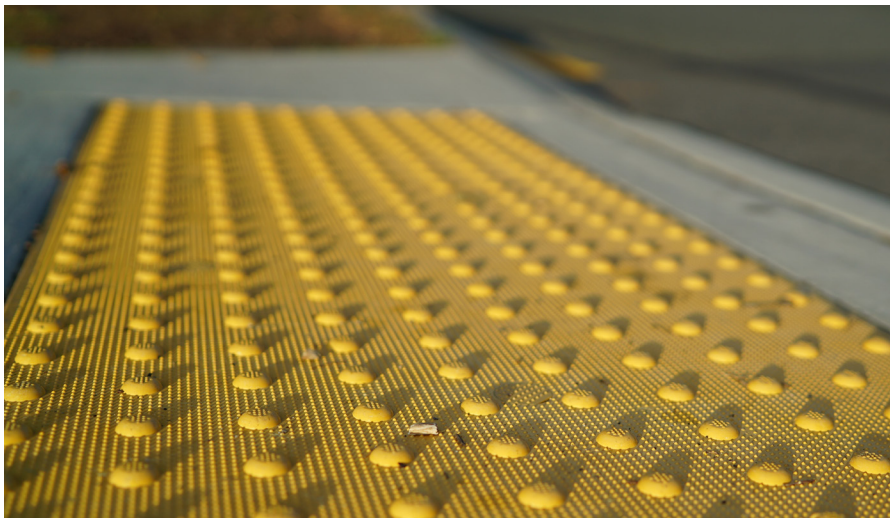
The results of these decisions—decisions to overlook the real-world consequences of prioritizing vehicle throughput—are clear to

13 Richard Rothstein. The Color Of Law: A Forgotten History of How Our Government Segregated America. New York. Liveright Publishing Corporation. 2017

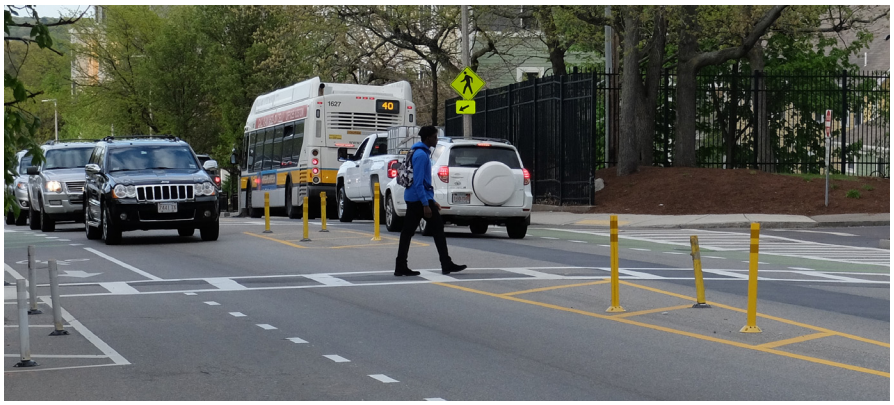
this day: in non-white and lower economic status communities suffer double the risk (compared to whiter and higher economic status communities) of death and injury on roadways designed to prioritize mobility over safety through their communities. We have an ethical obligation to rectify this history and help the public, the media, politicians, and even our own colleagues understand the injustice of our present system and why it is important for these roadways to operate at lower speeds, to provide sidewalks, and create safer street crossings.

While the traditional E's of our profession provide tools to address the health, safety, and welfare of our communities, they are not sufficient to guide decision making. We need a values-based framework centered on Ethics, Empathy, and Equity to guide our decision-making process and application of the Engineering,Education, and Enforcement strategies we recommend. We believe this should be norm for the industry.

This will require changing the hearts and minds of many people who have become numb to the societal damage created by our prior approach. Time is of the essence, because while you read this, another person died and 105 more people were injured on our road system.

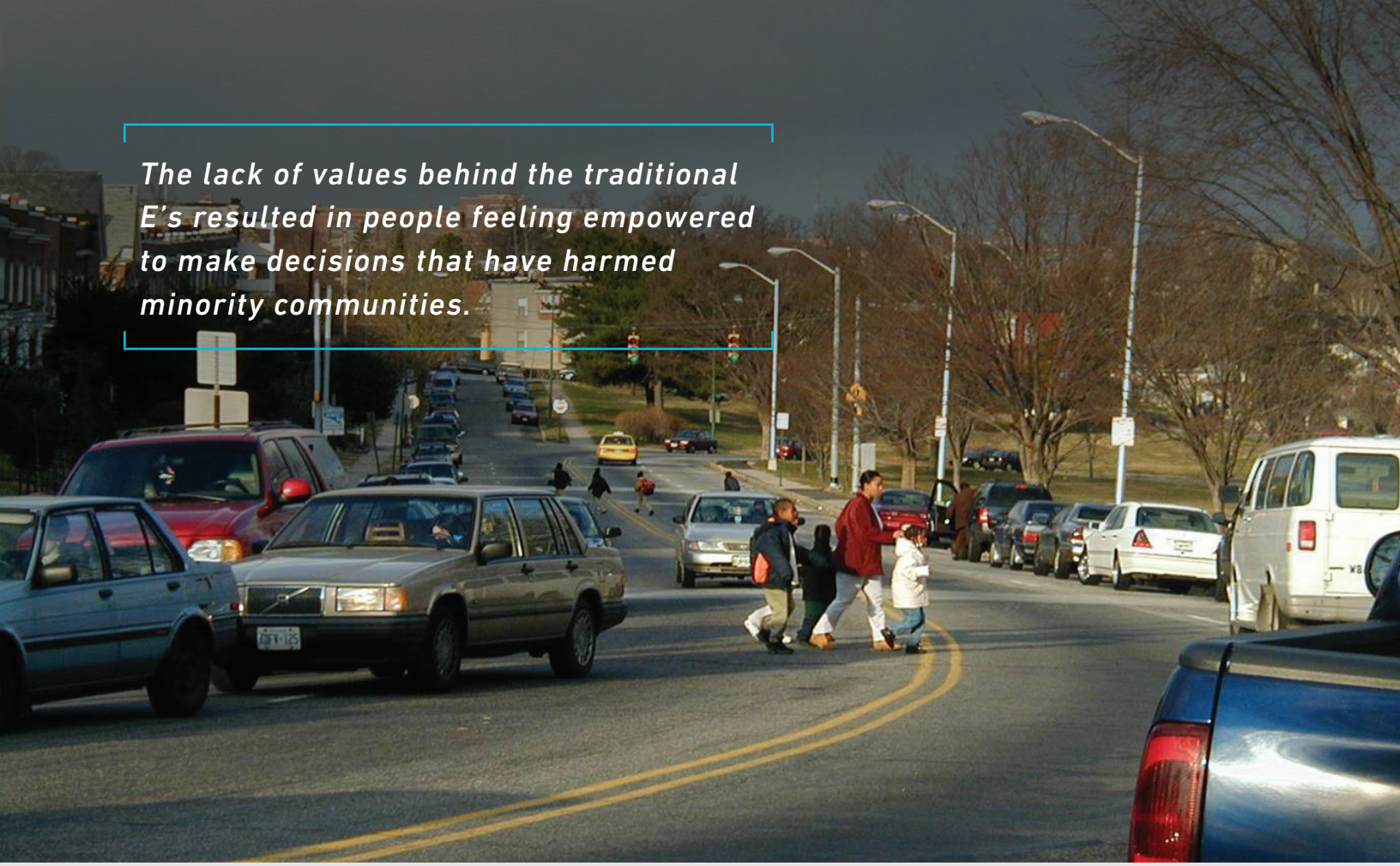


Adding detectable warning plates to curb cut-outs don't just greatly improve ease of use for the visually impaired - they save lives.



Rapidly implementing safety measures, such as pedestrian islands, can quickly reduce crashes and improve pedestrian comfort on wide streets.

Traffic calming measures like raised crosswalks prioritize the safety of vulnerable users over the movement of cars.



The lack of values behind the traditional E's resulted in people feeling empowered to make decisions that have harmed minority communities.

THE CASE OF RAQUEL NELSON

On April 10, 2010, Raquel Nelson's 4-year-old son was killed after being struck by a hit and run driver who had been drinking and using drugs while she and her children were crossing a busy Marietta, GA street. The driver had already been convicted of two prior hit-and-runs. He pleaded guilty and served six months in jail. However, Nelson herself was convicted on three charges related to her son's death. Each is a misdemeanor, punishable by up to 12 months in prison. Nelson could spend up to six times as many months in jail as the man who struck her son and then fled the scene. Nelson's crime: jaywalking.

Nelson's apartment building was located across a five-lane road from where she disembarked at a bus stop, and the closest crosswalk was three-tenths of a mile away. Other tenants in Nelson's apartment complex had complained to the city about their difficulties getting home from the bus stop, but a safe crossing was not provided. She was prosecuted for finding it unreasonable to walk 20 minutes out of her way while the roadway was designed to minimize motorist delay. A delay which the transportation profession considers intolerable for motorists but is seemingly acceptable for people not in vehicles.

Education, Engineering, Enforcement are strategies to solve transportation challenges, but they do not provide decision making guidance because they do not have an organizing philosophy. They are siloed approaches to achieving society's transportation goals and they do not help a person evaluate trade-offs to inform a decision to take action. For over 100 years our society has been using these traditional E's to build our communities and the transportation infrastructure to support them. The lack of values behind the traditional E's resulted in people feeling empowered to make decisions that have harmed minority communities with the forced removal of black families in cities to construct highways for white suburban commuters, to prioritize the mobility desires of people living in sprawling suburban areas from the safety needs of people living in communities through which high speed and volume roadways passed through, to degradation of the environment, and system that kills 30-40 thousand people annually and injures hundreds of thousands more.