



Monatsbericht

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STREETS FOR CARS,
NOT FOR PEOPLE

--How the Technocratic Road Building Process in America
Determines the Design of the Built Environment--

STRASSEN FUER AUTOS,
NICHT FUER MENSCHEN

--Wie das technokratische Verfahren des Strassenbaus in
Amerika die Stadtgestalt determiniert

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Table of Contents

I.	THEME	2
II.	OVERVIEW	2
III.	PUBLIC ATTITUDES	3
	Right To Drive	4
	Right To Park	4
	Right To Speed	6
IV.	PROFESSIONAL CULTURE	8
	Linear Thinking and Design	8
	Who Is The Customer?	10
V.	RULES	16
	Walking Rules	16
	Driving Rules	18
VI.	CONCLUSIONS	23
	Suggestions	23
	MY IDEA	24

Notes on Terms:

Planning, Design, Engineering are used interchangeably to describe the practice of how roads are conceived and designed.

Street, Road, Highway, Traffic are used interchangeably to describe the place where one walks, drives, cycles, parks, etc.

I. THEME

Based on the assumption that all people want to and will travel by automobile, an American technocratic system has sprung forth which essentially dictates how and where streets and roads are designed and built. This system has been promulgated by a cadre of professionals who have assumed the role of streetscape *arbiter*. As a result, the determination of the fate of the built environment has been effectively removed from public debate and innovative design.

This paper seeks to understand the underlying causes of this phenomenon through the perspectives of attitude, culture and rules. Attitude and culture speak to both the public's acceptance of the automobile, and the professional accommodation of the same. Rules are those statutes, policies and guidelines that have been enacted to standardize the motorized vehicular system and propagate its presence. As with any attempt to accommodate and regulate, there is the possibility that the ordering system will become so prescribed that the fundamental reasons for its existence will be lost. Consequently, no one is allowed to ask why?

II. OVERVIEW

In the section, *Public Attitudes*, the American attitude toward driving is explored. There is a perception in the USA that everyone should be able to drive as often and as fast as they wish, and parking should never be restricted. Somehow driving has come to equate freedom. Whether or not this is positive, it places severe limits on the design possibilities available to the street designer.

In the next section *Professional Culture*, the role of the engineering profession in the public realm is questioned. Specifically two questions are asked: Who is the Customer?, and Is a linear design process good for public roads? The answer to the latter is no. With a linear design process, the customer is the process, and never the public.

In the last section, *Rules*, the statutes governing walking, cycling, and driving and the guidelines for street design are researched. We see that while the rules and guidebooks have allowed the motorized traffic to become faster, safer and more efficient, the (un)intended side effect is that more environmentally sensitive modes of travel (foot, bike, train) have become slower, unsafe, and less efficient. Additionally, the guidelines that were intended to aid in the design of streets have become the de facto law; thus engineers are not allowed to design.

III. PUBLIC ATTITUDES

The United States has historically been the land of the free; the place to pursue life, liberty and one's own happiness without end. Fundamental to this is the concept of unlimited travel, which is enshrined in the Constitution. In the 18th Century, this travel generally took place by foot, horse, or carriage and as such was relatively safe and non-polluting. With the advent of the automobile, this 'right to travel' has taken on a different meaning - that of the 'right to drive'. While it is not the intention here to debate one's freedom of movement, one needs to explore how vehicular traffic has infringed upon the rights of others.

First, consider the subject through the prism of a school. Ideally one wants a school, especially a primary school, to sit at the center of an interconnected pedestrian and bicycle network. Why? Because that is how the children get there. Ultimately, one would want to connect these pathways to the park and train/bus station so that children and their parents can access them during all hours. The surrounding 'vehicle' streets should be designed so that there is access, but at reasonable speeds (max. 30 km/h). Any crossing of a high volume or high speed street needs to physically favor the little children. Not simply through flashing yellow lights and/or crossing guards, for these are advisory and temporal at best. The streets and land need to be (re)designed to accommodate the children at the expense of the driver. After all, if a society does not protect its children, what will its legacy be?

Researchers are now beginning to understand the dangerous relationships between vehicle traffic and child welfare. A recent study comparing child pedestrian death rates to traffic volumes in the United States found that there was a close relation between the two. It concludes that:

...child pedestrian death rates...are very sensitive to short term changes in traffic volume. Public policy changes which limit the growth in traffic volume have the potential to accelerate the decline in child pedestrian death rates.¹

The following example is typical of a street widening scenario. It occurs in Jacksonville, Florida, where the street next to Loretto Elementary School was widened from two to five lanes. Along with the widening, the crosswalk that formerly led directly to the school door was to be moved to accommodate the requisite 'sight stopping distance' of the faster vehicles on the larger street. To complicate matters, children would now have to cross bus parking lot driveway to get to the new crosswalk.

To defend the design, the City Traffic Engineer stated that the new crosswalk was in ...the standard location. The purpose of these flashing lights is to advise motorists that they have children crossing the road... not to delineate the entrance to the school. He also noted that drivers leaving the parking lot are not normally aware of pedestrians. They are looking for vehicles.²

In essence, the street and sidewalk are designed for the driver, not the child trying to cross or walk along them. The public, fearing for the safety of their children, increasingly drive them to school. This augments the situation, and further gives the designer reasons to design for the vehicle.

¹ Child pedestrian deaths: sensitivity to traffic volume--evidence from the USA. I. Roberts and I. Crombie. *Epidemiol and Community Health Journal*, April 1995.

² Crossing light to be moved at school. Dan Scanlan. *The Florida Times-Union*. Jacksonville. FL. 5 Aug 98

Right To Drive

We're such a car-oriented society. If people talk about denying access to the automobile, some people become volatile, said the leader of a transportation task force in Minneapolis, Minnesota where a traffic calming project was being proposed as an alternative to a planned street widening and tree removal. While many people heralded the plan, the main opposition came from suburbanites who had concerns over their loss of speed/access/mobility.³

Whoever is inconvenienced will always object. Why commuters always object can be explained partly by understanding the pattern of streets and the concept of equal access.

American urban and street design is largely based on a gridiron (rectilinear) system of streets. Without digressing to discuss the roots of this pattern of development, it can generally be said that streets are laid out to provide equal access. There are really no 'old' cities in America based upon medieval fortifications. Generally there is a radial plan only as far as railroads are concerned (these predated the gridiron). In Manhattan, the grid system was developed in 1811 to provide maximize frontages for development. Frank Lloyd Wright glorified the grid in his plans for Broadacre City. For whatever benefits the grid system has brought us, it is clear that as cities grew, and the grid expanded, inner city streets became more and more congested with traffic from the suburbs.

The legal structure of civic entities in America can be generally seen as equal access for all. Unlike in other countries where national governments support and encourage more important cities (Paris, Berlin, Frankfurt Airport) and limit development in others. In America the idea is that each town of any size should be entitled to an Interstate highway. The task of providing this has fallen to the national and state governments, so that all towns and areas will have equal consideration. Perhaps this is a spatial representation of a free-market economic system.

What Americans have not come to realize is that unlimited access by car for some is detrimental to others, especially those who live in places built before the car. This sets up scenarios like in the example from Jacksonville and Minneapolis, where the road was being widened to accommodate growing commuter traffic, but at the expense of the local population.

Right To Park



An Exalted Attitude

Coupled with the perception that Americans have a right to unlimited driving, is the notion that all 'extra' street-space should be made available for free parking. This has its roots in common law, where all parts of a highway's right-of-way (das offentlich Wegerecht) not used for travel may be used for temporary storage. As the size of our stored vehicles become larger, and our urban

³ ^aMinneapolis being driven to traffic calming; Resident reaction as varied as plans. Steve Brandt. *Star Tribune*, Metro Edition Minneapolis MN 19 May 96

environments become denser, the value of this space increases. With that, proposals to limit this space take on economic, legal and spatial dimensions.

In the Greenwich Village neighborhood in Manhattan (the most densely settled city in the nation), street parking issues are often at the core of any plan to alter street use. There have been various efforts over the years to calm traffic in the Village, from weekend street closings, to roadway narrowings, to street direction reversals, but almost all suffer from the 'right to park' addiction.

At one meeting of the Community District Two Transportation Committee an advocate asked a simple question. How many on the Committee have cars?⁴ The answer: 18 out of 20.⁵ This was quite unusual for an area of the City that had 22% car ownership or access according to the 1990 census.⁶ About half of those car owners parked on the street. The going rate for a parking garage is about \$200-300/month (EU240-360), depending on if it is indoors or not.

This then was not a Transportation Committee, it was a Free Parking Committee. Demographically, it did not represent the transport habits of the population, and half the members had a vested interest of at least \$2400/year (EU2880).

In New York City, the city owns all the land between the property lines. This is known as the right of way (ROW). It includes the sidewalk and street. While it is the City's responsibility to construct and maintain the street (that which is between the curbs), it is the adjacent property owners responsibility to construct and maintain the sidewalk. Technically, they are also responsible for cleaning the first 45 cm of the street (known as the gutter), but in reality, this is performed by the city. Property owners are also legally liable for accidents (pedestrian slipping on ice, or tripping on cracks) on their sidewalk. Whenever the city proposes to widen the street, property owners are generally receptive, for there will be less sidewalk for them to maintain. The opposite is true for street narrowings.

Americans see their streets as curb to curb entities, including both the travel and the parking lane. In other lands (Europe for example), the street is generally viewed as just that part of the roadway where vehicles travel. Cars are generally parked on the sidewalk - in between the trees, hydrants, and garbage bins. To narrow an intersection with corner extensions or narrow a street with curb extensions in Europe seems ordinary, but to reduce any part of the roadway in the States runs counter to the notion of a wide and limitless expanse of freedom.

In Queens and Boston⁷, objections were raised to traffic calming plans where proposals for corner extensions appeared to reduce on-street parking in areas with little off-street parking options. Yet in both situations, the corner extensions would only remove parking that was already illegal - at the corner, in a crosswalk, or at a fire hydrant.

⁴ There are 59 Community Districts in New York City. These are appointed councils which advise the city government on local matters. The Village is in Manhattan CD2.

⁵ Author's conversations with Paul Harrison of Transportation Alternatives, New York, NY, 1995.

⁶ *1990 Census*. US Census Bureau.

⁷ ^aCambridge joins movement to make traffic calm down. Peter J. Howe. *Boston Globe*, Boston, MA, 3 Feb. 97. www.boston.com

Right To Speed



You Are Entering A Residential Area. Please Keep Speed To 25 MPH.

In St. Petersburg, Florida, a recent proposal to install speed humps was critiqued by some who believe that if police would simply enforce the speed limit, everything would be fine.

...considering the fact that most of the people...are residents of the neighborhood, they're going to get two tickets and they're going to slow down.⁸ In theory this is correct, yet the rules continue to be neither obeyed nor enforced. The public tolerates negative driving behavior, for almost everyone is an offender. Likewise the police generally only enforce what the public desires. In New York City, where one is more likely to be killed by a car while walking than...shot and killed by a stranger with a gun.⁹ the city's leading newspaper argues against searching the vehicle of drivers stopped for a simple speeding violation.¹⁰ Generally, police may not search people or their property without first obtaining a search warrant from a judge.¹¹ These rights are set forth in the Constitution and are not in question.

Stepping away from the Constitutional issues, could the threat of having ones car searched and/or taken away be an effective deterrent to speeding? The rationale is that a driver of a 'private' vehicle on a 'public' street has a responsibility toward that public domain, which overrides the right to privacy. Automobiles have been given a special place in American society, so the notion of intruding into that sacred sphere is troubling. Nevertheless, with all that is known today about speed and fatalities, it is fair to suggest that anything that may cause people to slow down - and fear of search and seizure is a fairly potent fear - should be considered. Not dismissed as simple.¹²

When speaking of speed limits and their enforcement one needs to consider the minimum allowed by law. Generally minimum thresholds for speed limits in the States is 40 or 48 km/h. The

⁸ ^aTensions revved over 'traffic calming' devices. Carlos Moncada. *Tampa Tribune*, Tampa, FL, 9 May 98.

⁹ *Mean Streets: Pedestrian Safety and Reform of the Nation's Transportation Law - New York*. Surface Transportation Policy Project, Washington, DC, 1997. www.transact.org.

¹⁰ ^aSpeed and Civil Liberties, editorial. *New York Times*, 13 Nov. 98. www.nytimes.com.

¹¹ Recently the New York City Police Department has begun to confiscate the automobiles of drivers arrested for drunk driving. It will be interesting to see how this very proactive safety measure withstands legal challenges.

¹² The driver was stopped traveling 72 km/h in a 40 km/h zone. The Supreme Court ultimately ruled 9-0 in his favor.

regulatory history of this practice was grounded in attempts to eliminate speed traps in the 1950's.¹³

Speed traps mainly occur where a rural highway passes through a town. The town, wanting to control the speeds on its streets, would post a speed appropriate for that town, but far below that of the highway. Drivers, accustomed to highway speeds and not paying attention to the signs would get caught and have to pay a hearty fine. The money would go to support the town, and generally outrage everyone else.

There have been movements within the State Legislature for the past two years to allow lower speed zones in New York City. The notion of a speed trap is somewhat comical in the City, with its 100,000 kilometers of roads on 3 islands and one peninsula. Nevertheless, both efforts have failed, primarily because legislators fear the potential popularity of the program. They fear that other towns would reinstate the reviled speed trap. Or seen in another light, they do not want to allow neighborhoods to control their own streets. The supposed rights of drivers to travel quickly are held in higher esteem.

Low speed zones (24 km/h) are generally allowed in school zones, but typically only during school entrance and exit times. The notion of time-based school safety zones is completely without merit in terms of the protection of children. To think that children only come and go to school twice a day is silly. Kids use the playgrounds on the weekends, they stay late for band and football practice, they go early for tutoring. Why strive to protect only those who arrive on school days between 7:00 and 8:00, and depart between 14:00 and 16:00?

Even if they are permitted, school speed zones are not always implemented. Out of 1600 primary schools in the City of New York, there is only one with a 24 km/h zone. This zone is on a major vehicle and truck route and is signified by flashing yellow lights, which are often broken. Coupled with the almost complete lack of police enforcement or public awareness, the effect is negligible. Its failure is continually cited as a failure of low speed zones in general.

As to the lack of school low speed zones, the Director of Safety at the NYC-DOT once stated that if the city installs one school low speed zone, then every school will want one. And besides, the police never enforce the laws. We cannot physically control speeds on the streets because it would go against current engineering policies. And if we do, we will be sued. And if we get sued...

¹³ *Traditional Neighborhood Development: Street Design Guidelines*. Chester Chellman, principal author. ITE Transportation Planning Council Committee 5P-8 Institute of Transportation Engineers Washington DC 1997

IV. PROFESSIONAL CULTURE

According to a recent survey of traffic calming in America, traffic engineers believe fully that two-thirds of all traffic calming projects were politically motivated.¹⁴ Both this question and answer raise important issues with regard to the attitude which the professional community views street design. Because streets and roads exist within the public right of way, it follows that any work performed therein is subject to public debate. It is through this political process that the community decides its future. Why then do engineers look askance? Part of the answer may be found in understanding the nature of engineering itself, and for whom engineering is performed.

Linear Thinking and Design

In any design situation, there is problem identification and problem solving. An old saying is that if one has one Euro to solve the world's problems, one should spend 95% on issue definition. From a design point of view, this process is circular; one plans, designs, engineers, evaluates, plans again, engineers, etc. Design is partially a process of discovery.

Problematic in the current American street and highway design process is a regimentation of roles from planning to engineering. In between is an orderly, linear process. For example, a planner establishes a line on a map of an intended highway. He takes into consideration the existing land use, features, transportation systems, etc. of the time. Part of that planning involves classifying the road according to its function.

Maybe 10 or 20 years later, that line is transformed into a road. Here two things usually happen. First, because of the disparity between transportation and land use planning (or lack thereof), there is typically no system by which the proposed corridor has been appropriately developed. So what is on paper does not conform to the reality of the present day.

Second, and this is the fault of professional specialization, the proposed road is engineered and built without a effort to understand if it is appropriate. Take design speed. According to the chart for a highway classified as X, the design speed must be Y. Consequently, the road must then be so wide, so straight, and so fast. In a vacuum, this is true, but in the real world probably not so. Yet there is a tendency to simply accept the plan as gospel, and not question its truthfulness.

This entire episode shows its ugly face when the developed plans are shown to the public. Having not been involved in the process, they are now seeing for the first time a wide, flat road in place of the tree-lined street that winds along with the river. Engineers are placed in the uncomfortable position of having to defend the current transportation policy (or lack thereof), and they seek to justify their actions with 'the rules'.

The following passage succinctly describes the effect of a linear decision model on the natural environment. It is excerpted from an explanations pamphlet produced by the Florida Section of the Institute of Transportation Engineers.

¹⁴ *A Survey of Traffic Calming Practices in the United States. A. Weinstein, E. Deakin. *IURDevelopments*, Institute of Urban and Regional Development Berkeley CA March 1998

Why Do They Have To Remove Those Nice Trees Next To My Roadway?

In Florida, during 1985, crashes involving trees accounted for 230 fatalities and 7,905 non-fatal injuries. Trees must sometimes be removed near a roadway in order to improve the sight distance, which is the length of road ahead visible to the driver.

Many traffic crashes involving trees occur when vehicles run off roadways with little or no roadside clear zone. The roadside clear zone has been defined by the Florida Department of Transportation (FDOT) as that area outside the traveled way available for use by errant vehicles. Vehicles frequently leave the traveled way during avoidance maneuvers, due to loss of control by the driver or due to collisions with other vehicles. Common circumstances that may cause a driver to run off the roadway can be driver or environment related. Driver related contributing circumstances which may cause a vehicle to stray off the roadway include: improper passing, alcohol or drug involvement, falling asleep, driver inattention, or driver distraction. Environment related contributing circumstances which may cause a vehicle to run off the roadway include: debris in roadway, glare, holes or ruts in roadway, slippery surface, water ponding or animal in path of the vehicle.

A manual was developed by the FDOT to provide uniform minimum standards and criteria for the design, construction and maintenance of all public streets. The manual often referred to as the FDOT Greenbook, is entitled Manual of Uniform Minimum Standards for Design, Construction and Maintenance of Streets and Highways. The standards presented in the manual are intended to provide the basic guidelines for developing and maintaining a highway system. Objective #6 of the manual is to Provide a hazard-free environment that is forgiving to a vehicle that has badly deviated from the travel path or is out of control. Page III-35 of the manual states that the width of the roadside clear zone should be made as wide as is practicable. The minimum permitted widths are given in Table III-12. These are minimum values only and should be increased wherever feasible.

The FDOT standards require a minimum width of roadway clear zone in accordance with the design speed of the roadway and the type of area, rural or urban.

In rural areas, with a roadway design speed below 35 MPH (56 km/h), a minimum clear zone width of 6 feet is required. For a design speed of 35, 40 and 45 MPH (56, 64, and 72 km/h), a minimum clear zone width of 8, 11 and 14 feet (2,4, 3,3, and 4,2 m) respectively, is required. For a design speed of 50 MPH (81 km/h) and above, a minimum clear zone width of 30 feet (9,0 m) is required. In urban areas, with a roadway design speed of 45 MPH (64 km/h) or less, a minimum clear zone width of 4 feet (1,2 m) is required. The 4 foot (1,2 m) minimum required clearance area applies to the placement of trees behind curbed islands and roadway edge. For a design speed of 50 MPH (81 km/h) and above, a minimum clear zone width of 14 feet (4,2 m) is required.

In summary, trees in the roadside clear zone can be harmful in two ways: Trees can prevent vehicle recovery to the roadway and increase injury severity and property damage when crashes do occur. Good traffic engineering practice and state standards require that an adequate roadside clear zone be provided on all new road construction projects. This requires that the roadside clear zone to be clear of trees and other fixed objects.¹⁵

(underlined emphases & metric conversions added)

¹⁵ *Traffic Information Program Series*. John T. Izzo, PE, editor. Florida Section (District 10) of the Institute of Transportation Engineers www.uitrc.ce.ufl.edu/fsjite/comfins

Imagine reading the above to a group of homeowners standing next to a 100 year old tree; or who live near a forest. The failings of the technocratic culture become apparent. While this is a first rate linear argument, it fails to acknowledge that there may be other reasons to save the trees. It does not question the need for the road versus the need for trees. For this reason, it cannot be appropriate reasoning for the design of public streets.

Who Is The Customer?

For the better part of the Twentieth Century, the *modus operandi* of the roadway design and engineering profession has been to build more, longer, wider and straighter streets. The customer was and is the car. To wit, the Institute of Transportation Engineers, one of the nation's leading organizations of transport engineers has published the below commentary:

While traffic engineers have a responsibility to provide for the safe and efficient flow of all types of road users, traffic-control measures are too often designed with the sole interests of motorists in mind, and pedestrians are left to 'fend for themselves' on streets with inadequate crossing times, confusing traffic-control devices, excessive delays, and construction zones with little or no provisions for those who walk.¹⁶

This attitude manifests itself in various anti-walking and cycling rhetoric.

The history of traffic safety education is best summed up by the statement 'teach people to stay out of the way'. A good example is the recent campaign to warn pedestrians in New York of the dangers of walking at night. The NYC-DOT printed brochures that, among other recommendations, advised people to wear bright, reflective clothing. This is a somewhat ludicrous suggestion for the fashion capital of the world.



If everyone wore these vests, would drivers yield more often?

Beyond the fashion issue, this example speaks volumes about how traffic engineers abdicate their primary role as street designers. It is common mantra for traffic experts to speak in the Three

¹⁶ "Summary and Conclusions. *Design and Safety of Pedestrian Facilities*. Charles Zegeer, Chairperson. ITE Technical Council Committee 54-5. Institute of Transportation Engineers. Washington DC. 1995

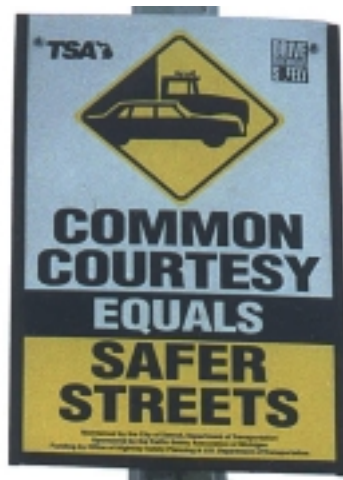
E s : Engineering, Enforcement and Education.¹⁷ Yet time and time again, whenever the question is the interaction between drivers and pedestrians, the answer is more education or enforcement. Never more engineering.

In analyzing the safety deficiencies of a street network, it is common to research fatality reports. While this may be good science, one must question the methodology if the results do not address the original problem.

- Collision involvement rates...are the highest for 5- to 9-year-old males, which is related in part to their tendency to dart into the street.
- ...of all adult pedestrians killed in night-time collisions with motor vehicles, 59 percent had blood alcohol concentrations of .10 or greater, while only 31 percent had no alcohol in their blood.¹⁸

The fact that a disproportionate number of little boys and drunks get hit by cars does not address the deficiency of the street network; it only serves to divert attention away from the real issues. No one will ever invent a way to control rambunctious little children, nor intoxicated adults. Even if it were possible, the rationale as to why street designers should be involved in these endeavors is a mystery. What street designers can do is design streets that enforce proper driver behavior (speed humps, narrower streets, curb extensions), and lessen the impact to others when cars crash (bollards, refuge islands, raised crosswalks).

Often times, those on the ground floor of the transportation system: the police, take these matters into their own hands. For example, Bourbon Street in New Orleans, with its bars open all night, is made a pedestrian mall overnight. Many narrow streets in the Village of New York are closed on weekend evenings to allow the people on the crowded sidewalks to spill into the street without worrying about traffic. In the vacation town of Provincetown, signs expressly permit people to walk in the downtown streets, as a way to slow traffic. Police deal everyday with the impacts between vehicles and people, and often realize that the elimination of fast traffic usually eliminates the problem.



If you could see this sign while driving 64 km/h, would you drive more courteously?

¹⁷ The use of reflective clothing and materials by pedestrians at night is cited in the Introduction to *Design and Safety of Pedestrian Facilities*. It is given equal standing with Engineering, Education, Enforcement, and Vehicle Design.

¹⁸ ^aIntroduction *Design and Safety of Pedestrian Facilities*

The typical engineering response to politically sensitive safety issues is to install warning signs, which have never been proven to do anything. In discussing the design of intersections between expressway ramps with local streets, an ITE handbook on the Design and Safety of Pedestrian Facilities states that ...the level of hazard...can be lessened through the use of appropriate traffic-control devices (e.g., warning signs) to reduce vehicle speeds...¹⁹ Elsewhere, it is stated that Overuse of warning signs breeds disrespect and should be avoided. No accident-based studies have been able to determine the effectiveness of warning signs.²⁰ Which is correct?

A wonderful example of an over-reliance of warning signs was the NYC DOT's experimentation with safety zones. In 1997 five areas around the city were chosen, each with a combination of high pedestrian-vehicle crashes and elementary schools. Yet instead of actually modifying the road, signals or regulations to moderate driver behavior, a series of yellow safety zone signs were installed. While no one is really sure what a safety zone is, or what is expected of the driver in one, the crowning glory was the exit sign: EXITING SAFETY ZONE, DRIVE SAFELY.

Warning signs are the cheap solution to often recalcitrant traffic problems: no honking, no speeding, playground ahead, pedestrian crossing, etc. Signs are cheap to make (New York City has its own sign manufacturing shop), cheap to install, and cheap to defend. To wit, if it cannot be proven that signs reduce crash rates, then it also cannot be proven that they increase crashes. In other words, they are lawyer-free, and politicians may stand by them for photo opportunities.

When reconstructing a roadway, it has become acceptable to provide no accommodations for pedestrians. Vehicular traffic is allowed to pass through a construction site, but not pedestrians. While this is generally illegal - there are various statutes that require adequate passage for all to be maintained - enforcement is often lax. Again, we find that the customer is the car, not the people.

In Bellevue, Washington while refurbishing the street and sidewalk next to Samammish High School, no interim effort was made to provide for those walking or cycling to school. A citizen who moved the barricades (blocking the sidewalk) so that he could squeeze through without having to walk into the street was accused of 'vigilantism' and threatened with arrest. Enraged, the pedestrian returns everyday to the work site with camera in hand to document the infringement upon the pedestrian space. Ultimately, the City agrees that at least they should post 'Sidewalk Closed' signs.²¹

¹⁹ "Roadway Design Considerations. M. Pietrucha, K. Opiela, and C. Plummer. *Design and Safety of Pedestrian Facilities*.

²⁰ "Pedestrian and Motorist Signing. M. Cynecki. *Design and Safety of Pedestrian Facilities*.

²¹ "Pedestrian Politics. Rod Van Mechelen. *The Backlash* 9 May 96. www.backlash.com/oljv/nedes



No Sidewalk No Walkway Get Hit By Car Sue

New York City's Queensboro Bridge was built in 1909 with a pedestrian/cycle promenade as a major feature. As motor traffic grew, the promenade was made accessible to cars, thus removing the green transport option. In 1979, the city returned the promenade to walkers and cyclists, but not all the time. Whenever there is construction or a traffic emergency, the promenade is open to cars. In fairness, the City provides a free shuttle service, yet it is as if the thousand cyclists (the second highest number in the city) who use the bridge everyday do not really exist.²²

Arguably, one needs to allow a certain amount of leeway during road rehabilitation, but a 'Sidewalk Closed' sign or a shuttle service only reinforces the notion that non-vehicular travel is discretionary and is not to be taken seriously.

Two statements in the literature synthesis prepared for the 1997 review of the Highway Capacity Manual poignantly illustrate the prevailing attitude toward cyclists:

- A high percentage of children are forced to ride bicycles...
- ...most bicycle trips are for social/recreational purposes where there is usually a higher tolerance for delay.²³

Both of these statements, even if they could be supported by statistics, are nonsense. In the first statement, is it really possible to consider bicycle riding by children a 'forced' activity. But, regardless, why is this stated? Is it the engineering community's mission to evaluate forms of travel, or to provide a reliable methodology to enumerate traffic?

The second statement falls apart when transposed to the automobile world. Can it also be said that people driving to church, to their friend's house to watch a football game, to the beach, or to a restaurant - all social/recreational purposes - have a similarly higher tolerance for delay? Alternately, what about cyclists who are traveling to work or to shop?

These exemplify how a supposedly 'technical' research diverges from its technical mission. Reading that cyclists are only casual road users tells the designer that they will accept a worse travel condition. In effect, it promotes the prioritization of motorists based on supposedly objective criteria.

²² The DOT has promised that the Promenade will be permanently returned to green traffic when the current construction ends in Sept. 1999.

²³ Literature Synthesis for review of the *Highway Capacity Manual*. Prepared by the Highway Research Center at the University of North Carolina, 1997. Author reviewed the chapters on Pedestrian, Bicycle and Signal Timing for the review committee of the upcoming revised edition.



Failed effort to stop pedestrians from crossing the street

The ultimate pedestrian *restrictor* may be the barrier. Strategically placed where the pedestrian would naturally cross the street (or where the vehicle would naturally cross the foot path), the barrier makes the foot traveler subservient to vehicular traffic. At times these barriers guide the pedestrian to a controlled crosswalk a short distance away, yet even this prioritizes cars over people.

The following items were taken from the ITE pedestrian facilities handbook. Together they demonstrate the confusion with which the profession deals with pedestrians and their un-vehicle like behavior.

- (Pedestrian) barriers should be used with care, since most barriers have proven to be rather ineffective in stopping pedestrians. Instead of stopping pedestrian from traveling along their desired path, a more concerned approach is, wherever possible, to improve the safety of the desired pedestrian path.²⁴
- the prohibition of pedestrians crossing the street is an acceptable alternative when one cannot provide appropriate signal timing.²⁵
-

Is prohibiting the movement of vehicles likewise acceptable?

- in the design of outdoor pedestrian malls, walking distances must not exceed 400 m. This is the maximum acceptable distance between anchor stores at either end of a mall, or between the mall and the parking lot or transit stop.²⁶
- it is reasonable to expect pedestrians to walk a block (90 to 180m) out of their way to a better crossing locations.²⁷

How can one expect pedestrians to walk almost the same distance ($180 + 180 + 30 = 390$ m) just to cross a 30 m wide street?

²⁴ "Roadway Design Considerations. M. Pietrucha, K. Opiela, and C. Plummer. *Design and Safety of Pedestrian Facilities*.

²⁵ "Signalization. A. Badgett, C. Zegeer. *Design and Safety of Pedestrian Facilities*.

²⁶ "Pedestrian Oriented Environments. I. Boyd. *Design and Safety of Pedestrian Facilities*.

²⁷ "Crosswalks and Stop Lines. M. Cvnecki. *Design and Safety of Pedestrian Facilities*

- The decision to use a barrier sometimes leads to a significant increase in property damage and motorist injury accidents and, therefore, the judicious engineer should carefully gauge the trade-off value of increased pedestrian protection against the potential for the dis-benefits of motor vehicle barrier impacts.²⁸

The above can be read two ways. On the one hand, the author is using the increased vehicular crash potential to argue against barriers. On the other, he is valuing the motorist and the car over the pedestrian. In effect, a Mercedes is worth more than someone's legs.

The current system strives to protect the driver (who drives so recklessly that she crashes into the sidewalk) and her car, rather than all the innocent pedestrians who just happen to be standing on the corner. This has been enforced by a non-political, linear design and engineering methodology, coupled with the notion that the most important element in street design is the car.

²⁸ "Pedestrian Barriers" G. Donaldson *Design and Safety of Pedestrian Facilities*

V. RULES

A recent effort to introduce the German Verkehrsberuhigung sign for proposed low speed zones in New York City ultimately stalled because the sign has a picture of little girl chasing a ball into the street. It is technically illegal to play in the streets of New York.

In analyzing the current highway design practice, one finds a number of rules that have been created to systematize and regulate the industry. These rules, which may or may not be legally binding, have the effect of limiting innovation and curtailing alternative transportation. Many design professionals and communities want to provide for the pedestrian, cyclist, and other 'green' transport systems, but they find that they must first change the regulations. It is as if one had to get a court order to build a larger door on one's house.



State Law: Stop For Pedestrians In Crosswalk.

Walking Rules

Walking and Driving required fundamentally two entirely different scales of operation. Over the years, the prioritization of vehicular traffic has been codified in the nation's legal system to the detriment of other users.

Prior to the promulgation of statutory right-of-way rules, the relationship between all road users was governed by common law. The courts ruled that no one had a superior right; all had equal and mutual rights to be exercised so as not to interfere unreasonably with the rights of others. Drivers had to be on the look-out for pedestrians and have their vehicle under such control that they could avoid a collision.

Pedestrians were required not to cause unnecessary obstruction and use such care for their own safety as a reasonable person would under the circumstances. Failure of the pedestrian to look out could, and still can, constitute contributory negligence and may bar recovery of damages in civil liability suits.

Between the turn of the century and the late 1920's, right-of-way rules were adopted throughout the USA to determine who had to give way to whom. It has generally been assumed that accidents will be avoided if the legally mandated rules of the road are strictly enforced and obeyed. Yet these rules had been issued without prior study of their consequences, and they resulted in irreconcilable contradictions between statutory and common law.²⁹

²⁹ "Your Right to Cross the Street." Kenneth Todd. Paper issued at the Pro Bike Pro Walk 98 Conference, Santa Barbara CA 1998. www.hjkefed.org

Crossing the street in cities has generally been relegated to crosswalks, and only with a WALK signal. For example, in Chico, a fairly progressive California college town with a high number of cyclists, city ordinances specifically state that pedestrians shall not:

- cross a street at other than a crosswalk in any central traffic or business district,
- cross a street at any place other than...by the shortest route to the opposite curb, or
- stand in or otherwise occupy any street, other than in a safety zone or in a crosswalk, if such action interferes with the lawful movement of traffic.³⁰

These types of laws create a perceptual environment where the onus is almost always on the pedestrian to avoid motorized traffic. To wit, following the death of a pedestrian crossing the street at a downtown entertainment district in Atlanta, a bystander commented that ...it was an accident waiting to happen...[pedestrians] don't pay attention to cars.³¹

Guided by these perceptions and laws, politicians and designers feel that they must further regulate pedestrian behavior, for the pedestrians continually do not obey the rules.



Limiting the legal opportunities to cross the street makes it easier to drive without paying attention to pedestrians.

In New York City, crossing the street in the middle of the block was legal until 1998, when the Mayor decided that foot travelers in Midtown were causing gridlock. He erected barricades and changed the law so that one had to cross at the signal. So far, the police have generally refused to arrest anyone, as it is completely counterintuitive to the nature of pedestrian travel.

At Missouri Southern State College in Joplin, students were walking directly across the road from the parking lot to the school without bothering to use the crosswalk at the corner. Current engineering thinking is that it is more dangerous to cross the street mid-block than at the corner. This is supported by fatality studies which suggest that because vehicles are traveling faster in the middle of a block, crashes with pedestrians more often result in deaths. So the University installed a fence to force the students to the crosswalk.³²

What was not done was an effort to provide a crosswalk along the natural pedestrian desire lines, for this be against the rule that people should only cross the street at the corner.

³⁰ Chico (CA) Municipal Code: Title 10 - Vehicles and Traffic, Chapter 10.35, Ordinance 2119. www.chico.ca.us.

³¹ "Hit-and-run death stirs debate. Gerrie Ferris Finger. *Atlanta Journal-Constitution*, Atlanta, GA, 5 Nov. 98.

³² "Gravel lots pose commuting problems. Tammy Spicer. *The Chart*, Missouri Southern State College, Joplin MO, 17 Oct 97

The Highway Capacity Manual is the engineering standard for calculating volumes, flows and capacities of street traffic, e.g. vehicles, pedestrians, bicycles, and buses. Because of its depth, it has become the *de facto* legal basis for many traffic related issues. Developments are issued permits based on the methodology found in this book. Signal timing is allocated to pedestrians based on the formulas found in this book. It is interesting to see how this manual treats pedestrian activity, and the ensuing legal impacts.

In calculating signal timings, there is no mention of the potential for pedestrian delay. Various studies it has been shown that pedestrians will cross the street illegally after waiting 30 seconds. This is also the time used in determining the number of elevators required in a new building - there should be enough to ensure that patrons do not have to wait more than 30 seconds. Yet the HCM assumes - incorrectly - that pedestrians on the corner will wait for the green light.³³



Should the pedestrians just walk on the taxi's hood?



Crosswalk Chicken

When calculating crosswalk level of service and time requirements, the HCM assumes that all drivers will yield to pedestrians in a crosswalk. While this is the law, it seldom happens. Recent statistical breakdowns show that 2 out of every 3 people hit by vehicles in the crosswalk are hit while crossing with the WALK signal. Yet instead of instructing the engineer to observe actual driving behavior or research the crash history, the HCM assumes that, because it is the law, that drivers will yield to pedestrians. Consequently, inadequate crossing times are allocated for the pedestrian.³⁴

Through these examples, one can see that when designers must operate within a system that is fundamentally wrong, the outcomes are predictable. Pedestrians, standing on the corner in the rain waiting for the light to turn, realize that the system was not designed for them. They know drivers do not yield when turning, so they cross in the middle of the block. All these actions have been deemed illegal, so people who want to cross the street are arrested as common criminals, or barricaded like cattle. The net effect is that, as vehicles continue to crash into, injure and kill pedestrians, it is the pedestrians who are blamed.

Driving Rules

Just as rules have been enacted to regulate pedestrian behavior, rules pertaining to the design of streets and operation of traffic have been written. For the most part, these have taken the form of guidelines put forth by various engineering bodies. While there are codes and legislation which deal with certain aspects (parking requirements, signs, handicapped access, speeds), there is no national highway design law per se. It is assumed that the engineering profession is responsible

³³ *Highway Capacity Manual, Third Edition, 1994 Update.* Transportation Research Board, Washington, DC.

³⁴ *Highway Capacity Manual Third Edition 1994 Update*

enough to govern its own designs. Given the conservative nature of the industry, most streets are designed according to the Green Book.

The Green Book, formally known as A Policy on Geometric Design of Highways and Streets, is published by the American Association of State Highway and Transportation Officials (AASHTO). A recent article in *Governing* magazine succinctly describes its policies:

The formulas and equations of the Green Book make it virtually impenetrable to the lay reader, but the principles that emerge from it are remarkably simple. The first one is that safety trumps all other considerations--history, aesthetics, community habits, community values. The design values given within this text, the Green Book states flatly, have safety as their primary objective.

The second principle is that in order to be safe, a road or bridge must accommodate drivers traveling at high speeds, even speeds considerably in excess of the legal limit. AASHTO and most state highway departments traditionally have used what is known as the 85th percentile standard. They calculate how fast the 15th fastest driver out of every 100 on a highway is traveling, and they commit to make that driver's trip free of danger. The AASHTO standards...assume that everyone on the road is a drunk speeding along without a seatbelt.

The third principle is that safety at high speeds requires width. And so streets, roads and bridges all become wider to accommodate the very fastest drivers. In the early 20th century, most urban streets and roadways in America were built between 18 and 24 feet (6,4 and 7,2 m) wide. By the 1960s, when most of the new pavement was being laid in suburban subdivisions, the width was nearly double that--32 to 34 feet (9,6 and 10,2 m).³⁵ (metric conversions added)



18.25m wide street on a residential block with a school and playground

It is important to remember that this policy contains only guidelines, not standards dictated by law. Even so, it carries legal weight, for it is the industry standard. To this end, the Conservative Law Foundation has produced an excellent handbook to achieving sustainable design through legal means. In it, they address the 'status quo' and suggest methods to alter it.

It is important to remember two things about conventional street and road design. First, it is based on a rather narrow set of engineering criteria. There are important considerations that it simply does not take into account. ... The paramount goal of design under the Green Book is to provide operational efficiency, comfort, safety, and convenience for the motorist. The needs of pedestrians and bicyclists, and the effects of roadway projects on the environment and communities, are secondary. Streets and roads designed in strict accordance with the AASHTO

³⁵ *Asphalt Rebellion* Alan Ehrenhalt *Governing Magazine* Congressional Quarterly October 1997

guidelines can be unresponsive to important public design goals and thus not totally well-designed.³⁶

The Green Book (and all 'guidelines') allow professionals to become lazy. The NYC-DOT's Chief Highway Design engineer once said that in order to have a particular traffic calming device, one would need 300m for advance warning signs. He based this on the speed limit and subsequent design speed values given by AASHTO. In a city of 60 x 240 m blocks, this is impossible, but it did give him an excuse not to calm traffic.

There are four basic elements within the Green Book and other design rules which act in concert to influenced our built environment: Design Speed, 85th Percentile Speed, Design Vehicle, and Parking Requirements.

Design speed is used to establish most components of a roadway including width, length, curvature, terrain, straightness, regard stopping distance, et. al. While the mathematical application of this feature is not in question, the use of a design speed that is higher than the speed limit, and based on the speed of the existing or proposed traffic is troublesome.

First, it is generally accepted that the design speed must be higher (generally 5-10 mph) than the posted speed and should always be above the operating speed, regardless of posted speed. Driving along a freeway, one finds that the car will almost steer itself when traveling at the design speed. This has a double effect. One, the driver is speeding and risks a traffic ticket. Two, as more people drive in this comfort zone, the average speed of the street increases. When the road is eventually rebuilt, a higher design speed will be used to accommodate the faster traffic.

Using a higher design speed than necessary has implications on the surrounding environment that is not always appropriate. Current guidelines suggest that the minimum acceptable design speeds for new or reconstructed flat, urban collector and local roads is 48-64 km/h. Local roads are those which primarily provide access to land, and have little or no through movement.³⁷ Given all that is known about the impacts of speed, why does a local, urban street which primarily provides...little or no through movement need a design speed of 48-64 km/h?



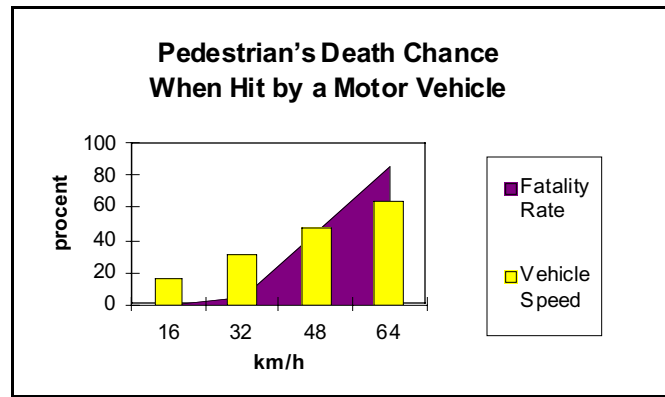
Residual sidewalk

³⁶ *Take Back Your Streets: How to Protect Communities for Asphalt and Traffic.* Conservative Law Foundation, Boston, MA 1998.

³⁷ *Flexibility in Highway Design.* United States Department of Transportation, Federal Highway Administration, 1998

The ITE recently published a handbook which addresses the use of a design speed meant to favor and protect the driver at the expense of the other users of the street:

If the street and its adjacent land uses are otherwise designed to create high numbers of non-motorists mixed with motorists traveling a typical speeds of 32 km/h, then to accommodate an errant driver at, for example, 64 km/h may have consequences that become significant to the other, more frequent users of the street.³⁸



It is a well documented fact that as the speed of a vehicle increases, the resultant incident of pedestrian death increases exponentially.³⁹ Conversely, any and everything that society can do to lower vehicle speeds, especially in areas where there is a high degree of interface between vehicles and pedestrians, will have a positive impact on the fatality rate of its citizens.

The 85th Percentile Speed is the industry standard by which speed limits and design speeds are established. The idea is that, if one knows how faster drivers are traveling, than one can make the street safer accordingly. It is supposed to be combined with other factors so that the optimal street design may be obtained. This is not always the case.

In practice, highway departments often focus on the 85th percentile speed to the virtual exclusion of all the other factors. The speed within which 85 percent of motorists are traveling is determined, rounded to the nearest multiple of five miles, and a revised speed limit is set at that level regardless of other considerations. Compromises are sometimes made in the face of exceptional circumstances or neighborhood pressure. But the standard practice is to ensure that only 15 percent of motorists will be exceeding the speed limit, rather than to determine what is safe for residents and responsive to various community needs and to balance motorists' interest in speed against the other considerations.⁴⁰

The design vehicle is that vehicle which has been identified as the maximum to be allowed on a particular street. Street and lane widths, turning radii, and parking spaces are based on this vehicle. Typically, the design vehicle for residential streets is the 30-foot (9 m) long Single Unit Truck (SU-30). This is to allow for deliveries of furniture and packages to households. In practice though, there are three problems which result.

One, the size of a typical SU-30 vehicle is often smaller than that prescribed by the AASHTO guidelines. For example, a United Parcel Service truck is 2,1m x 6,6m while the SU-30 design

³⁸ *Traditional Neighborhood Development: Street Design Guidelines.*

³⁹ *Walk Tall: A Citizen's Guide to Walkable Communities.* Pedestrian Federation of America. Rodale Press, Emmaus, PA, 1995.

⁴⁰ *Take Back Your Streets: How to Protect Communities for Asphalt and Traffic*

vehicle is 2,7m x 9m.⁴¹ Second, as streets are built wider to accommodate the SU-30, trucking companies use larger vehicles, knowing that they will be accommodated. Third, engineers typically treat two-way streets as if there was a wall down the center. No turn may ever be made that violates the center line. Many intersections and streets are designed so that two or three large delivery trucks may pass each other while traveling the speed limit. The result is overly wide streets that encourage speeding all other times.

Located in most building codes in the States is the provision that stores, workplaces, and houses must provide a minimum amount of parking. During the review of a night-club to be built inside an office building in Walnut Creek, California, the City inquired as to where all the patrons would park. The architects answered, in the parking lot. The city then asked, what about the office workers? The Code says that you must provide parking for all occupants. The architects answered, it is a night club. All the office workers will be gone by then. They will SHARE the parking lot.⁴²



Typical American suburban streetscape — plenty of space for cars

While it may have been good at one time to provide adequate parking, straight streets, extra width and turning room, the resultant streetscapes are less than ideal. They have created an environment where speeding is rampant, the streets that are too wide to cross on foot, and neighborhoods are broken apart in the name of traffic flow. Coupled with pedestrian regulations that only serve to outlaw natural pedestrian activity, one is left with an environment only navigable by automobile, and not changeable by responsible design professionals. The design dictums have been successfully indoctrinated and now set precedents which dictate subsequent designs.

⁴¹ *Traditional Neighborhood Development: Street Design Guidelines.*

⁴² Author's conversations with the Walnut Creek, CA building department regarding the Just Rewards Nightclub, 1988

VI. CONCLUSIONS

The planning, design and engineering of American streets, roads, highways and traffic in the latter part of the Twentieth Century may be seen as a fulfillment of the Cartesian ordering system. The various parts of the body have been thoroughly dissected and studied. Sets of standards have been written for each part. Yet as a whole, the interrelations of the separate parts is almost never in view.

As a way of illustration, consider a new road. The road is initially viewed as a conduit between two points - like a water pipe. Using statistical models, the number of vehicular trips in 20 years is estimated. A road is designed and built to handle that expected load. The speed limit is set at 85% of the design speed. Drivers, sensing that the road is over-built drive faster and more often. Pedestrians and cyclists, sensing that the street is not designed for them (no trees, skinny sidewalks, drivers do not yield, poor signal timing, no bike lanes), buy cars and drive themselves. Drivers and businesses agitate for more parking, and the building codes require it. In short order the street has reached 20 year capacity and speeds are 15% higher, so a new, wider road is built and the cycle repeats itself.

It is a *fait accompli*, brought about by the technocratic road building process dictating the design of the built environment.

Suggestions

The following are first steps to returning the design and engineering of streets and roads to the public realm:

- Involve the community in determining if and where streets are to be built and how they are to be designed. [Street design involves environmental, social, community and aesthetic decisions, which are best addressed through a multi-disciplinary approach. It is not purely a technical endeavor.] This will require both a rethinking of the role of the engineering community, and a general restructuring of the requirements for public street work.
- Set speed limits that are realistic and will be respected. [To design a road such that 15% of drivers may comfortably travel in excess of the speed limit is absurd.] The establishment of speed limits is generally under the purvey of the engineer, so he could set them lower, although in some States legislative changes will be necessary.
- Allow lower speed limits. [The solution to 'speed traps' is not to eliminate a town's ability to control speeds within its confines. Traffic speeds have such a wide ranging effects on the local environment that the responsibility to control it far exceed the rights of offenders.] This will require changing most state laws.
- Treat traffic issues, especially pedestrian and bicycle fatalities, as public health concerns. This will require legislators, judges and the police to address and deal with vehicle/pedestrian or vehicle/bicycle incidents as systematically predictable crashes, not random accidents.⁴³ Responsibility must also be established for each crash, which fundamentally lies with the operator of the larger and more dangerous vehicle.⁴⁴

⁴³ Between 1994 and 1997, drivers were largely or strictly culpable in 74% of the vehicle/pedestrian or vehicle/bicycle fatalities in New York City, yet only 16% received moving violation summonses. Source: *Killed By Automobile: Death in the Streets of New York City, 1994-1997*. Charles Komanoff and members of Right of Way, March 1999. www.rightofway.org.

⁴⁴ Presently, one could argue that it is in the legal interest of a driver to not injure, but to kill a pedestrian during a crash. If the victim is dead, then there will be no one to refute the driver's claim that he ran into the street out of nowhere. Given the duplicity of the pedestrian laws (see Chico above), a dead pedestrian can be assumed at fault for his own death.

- Eliminate the (perceived) legal requirement that roads must be designed in a certain manner. [As long as there is a threat of a lawsuit, innovation will be stifled.] Outside of certain traffic control devices and regulations, roadway design is generally protected from lawsuits by the concept of design immunity. Nevertheless, engineering decisions are constantly be challenged in court, so legislative initiatives to provide further immunity are needed.

Finally, the question is never, what does the street HAVE to be (according to the rules, traffic, etc.). The question is, as in any design scenario, what do we WANT the street to be. We have the power to exercise control over our built environment, and so we should.

My Idea

Instead of looking at the road system as a network of traffic conduits, look at each individual block as a place to live, work, and play. Have all residents/businesses on a block vote for what they want their street to be used. As each block decides, then a patchwork will spring forth of streets to travel on, streets to shop on, streets to play on and streets where people just park their cars. The streets, and their use will reflect a true vision of democracy and the free market.



Speed Means Death. Slow Means Life.

Notes on Author:

Michael King is an Architect and the former Director of Traffic Calming for the New York City Department of Transportation. Currently he is a visiting scholar at the ILS researching traffic calming, design and legal initiatives towards sustainable transportation and development in Europe.

All references to NYC are from the author s notes.

All photos taken by author.