Traffic Control: An Exercise in Self-Defeat

By Kenneth Todd

THE TRAFFIC CONTROL SYSTEM WE HAVE today was put together in the early days of the automobile by public officials who knew little about regulating the new means of locomotion. They adopted traffic laws without prior research, on the basis of subjective opinion. No underlying philosophy saw to it that traffic regulation met its purpose: safe and expeditious travel at an economical cost to the road user and taxpayer, with the least inconvenience to anyone.

Into traffic regulations crept misconceptions and contradictions that have killed innumerable people, cause massive traffic jams, waste innumerable hours of time and vast quantities of fuel, pollute the air, and lead to unjust decisions in civil accident litigation. The system violates basic legal, engineering, and safety principles, and billions of dollars are spent on high-tech computer equipment intended to overcome self-inflicted problems.

IN THE BEGINNING Before there were any statutory right-of-way rules, no one had a superior right; all had equal and mutual rights under common law to be exercised so as not to interfere unreasonably with the rights of others. The supreme rule of the road was the rule of mutual forbearance. Drivers had to be on the lookout for pedestrians and other traffic, and have their vehicles under such control that they could avoid causing collisions and unnecessary obstruction.

A driver who was about to enter an intersection let anyone who was already in it get out first, just as it is common sense and common courtesy to let someone get out of an elevator or phone booth before we get in. Thus, some courts began to rule in the mid-1880s, even before the automobile arrived on the scene, that anyone who arrived first or had already entered the intersection had the right-of-way under common law. A common law "first-come, first-served" regime survives today in the all-way stop, a traffic control for which no U.S. state has adopted a statutory right-of-way rule.

All this changed at the turn of the last century when a few municipalities issued ordinances to determine who had to give way to whom. But they did not investigate if the ordinances made traffic run better or worse than under common law. First, some cities gave northbound and southbound traffic priority over vehicles traveling east and west, while others gave eastbound and westbound vehicles priority over those going north and south. The rules proved unworkable even if one took the precaution of carrying a compass.

Then, a rule imported from France gave priority to vehicles on the right. The rule paralyzed traffic when drivers entered an intersection from all directions and obstructed each other from leaving. Traffic runs with minimal control if a driver who wants to enter an intersection gives way to all those who are trying to leave, as it was done under common law — that is, to those on the left and to the left-turners from the opposite direction. The modern roundabout — an improved version of the old traffic circle — works that way. But whether or not it comes in the shape of a roundabout, an intersection can operate under the yield-to-the-left rule in countries where motorists drive on the right side of the road.

Finally, the rule of giving vehicles on major roads priority over those on minor roads was adopted throughout the United States in the 1920s. The concept originated from railroad practice, where main-line trains have the right-of-way over those on the branch lines.

WHAT MAKES INTERSECTIONS DANGEROUS? The most frequent and most severe type of accident at a major–minor road intersection is the right-angle collision, generally blamed on the side-street driver's right-of-way violation. The major road makes motorists go fast without looking left or right, while side-street drivers have the complex task of finding safe gaps to pass through several vehicle and pedestrian movements. Safety advocates insist that complex tasks distract our attention from one conflict while we concentrate on another; road users should have to deal with only one conflict at a time.

While side-street drivers must wait at a stop sign until it is safe to cross, the pedestrians' right-of-way on crosswalks tells them they can do what is forbidden to the side-street driver: get in the way of fast-moving traffic. Many fast drivers are reluctant to stop at crosswalks for fear of getting rear-ended. That is how a false sense of security puts pedestrians on crosswalks at risk. The pedestrians' friend is the center refuge, which lets them cross in two stages.

One might have thought that the motorist, whose capacity to injure is greatest, should be held to a higher degree of care than is required of the more vulnerable pedestrian. Yet the law gives a criminal more protection than a pedestrian. A householder who kills a burglar by the use of excessive force is liable to prosecution. Drivers who hit a pedestrian outside of a crosswalk may be sued for damages in a civil court, but it is the pedestrian

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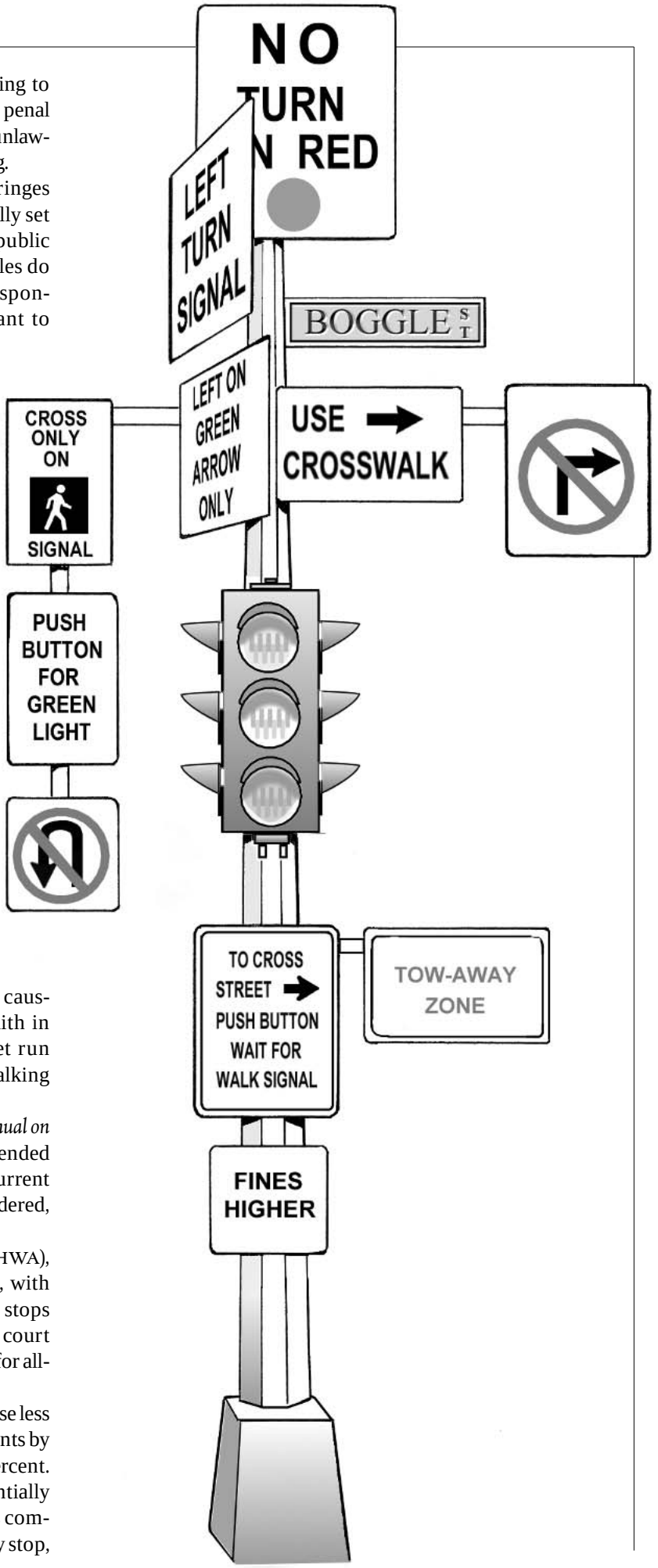
who ranks in the police records as the violator for failing to yield. The driver broke no law and is unlikely to face a penal charge unless there is evidence of some accompanying unlawful act, such as hit-and-run, speeding, or drunken driving.

Normally, the right of one person ends when it infringes unreasonably on the right of another. Statutes generally set penalties to reinforce common law obligations for public safety and discourage negligent acts. Right-of-way rules do the opposite. They diminish the main-street driver's responsibility and place an extra burden on those who want to cross. Every day, people are killed or injured — many of them incapacitated for life — because an irresponsible law encourages motorists to defy the most elementary safety rules and travel at high speed on urban arterial roads and intersections without looking for other traffic. The more stringent the division of responsibility between those who have priority and those who have to respect it, the less mutual forbearance and the more accidents we get.

The remedy for the problem of getting across a busy intersection was first the police officer and then his replacement, the traffic signal, another offspring of the railroad. But did that make travel safer and more expeditious?



HOW TRAFFIC LIGHTS CAUSE CRASHES Traffic signals cause rear-end collisions. They compress an hour's traffic into half an hour of green time and thereby halve all headways. They then make drivers go fast and keep close to the vehicle in front for fear of missing the green light, with their eyes up in the air rather than on the road. The combination of high speed, tailgating, diverted attention, and sudden stops causes rear-end crashes. The pedestrian's unshakeable faith in the traffic signal is entirely misplaced — as many get run down walking with the green light as get run down walking against red.

Traffic signal control is so unsafe that the official *Manual on Uniform Traffic Control Devices* already in 1935 recommended the trial and use of less restrictive alternatives. The current *Manual* lists 12 alternatives to signal control to be considered, among them all-way stops and roundabouts.

According to the Federal Highway Administration (FHWA), all-way stop intersections have the best safety record, with half as many accidents as those controlled by two-way stops or signals. Serious accidents are extremely rare, a fact a court has attributed to the absence of a statutory right-of-way for all-way stops.

Roundabouts are also far safer than traffic signals, cause less delay, and have more capacity. They have reduced accidents by half and serious-injury and fatal accidents by 60 to 90 percent. Novel roundabout designs can raise capacity substantially with no need to widen the road in its entire length, as is commonly done under traffic signal control. Like the all-way stop,

the roundabout gets rid of the left-turn problem, the traffic engineer's biggest headache.

Most drivers do not come to a full stop but treat the all-way stop as an all-way yield. As the yield sign has a safety record as good as the stop sign but gives less delay and a 50 percent higher vehicle discharge, replacing all-way stops with all-way yields will lower road user costs substantially.

HOW TRAFFIC LIGHTS CAUSE GRIDLOCK We all have sat waiting at a red light when nobody was using the green. But even if the unnecessary delay were eliminated, signals reduce intersection capacity, just when we need more of it in heavy traffic. Signals that have left-turn arrows give the worst performance.

Whenever traffic signals break down, we are told to treat the intersection as an all-way stop. The day the signals went out in a Washington, D.C., suburb, a commuter reported that he got to his job 25 minutes earlier than usual. Incredible as it may sound, an FHWA study found all-way stops to cause less delay than those synchronized signal systems the public keeps clamoring for. Such systems function only with moderate traffic volumes and usually in one direction only. Those drivers who travel in the opposite direction and on the side streets pay for it with longer delays. As traffic gets heavier, signal synchronization gets us faster to the next bottleneck, where we have to wait that much longer.

Official reports have attributed 40 percent of the vehicle delays in urban areas to traffic signal inefficiencies. If that figure is correct, the annual nationwide loss comes to 5.7 billion vehicle-hours, or $95 billion, plus $28 billion for wasted fuel and other vehicle operating costs. It does not include the delay to pedestrians, the harm to business, the air pollution, and the increased cost of living and accidents.

Nevertheless, in the years 1998 to 2001 the FHWA gave the states $1.13 billion in aid for traffic signal installation and improvements. If the Federal Aviation Administration funded an air traffic control system so unsafe and inefficient that its own guidelines advised against its use, there would be a public outcry, a spate of malpractice suits, and a congressional investigation.

WHO NEEDS NEEDLESS DELAY? The FHWA's *Manual* says traffic control devices should fulfill a need. Requests to the FHWA under the Freedom of Information Act have failed to find a need for the needless delay at a red light when we wait while no one is using the green.

Travel on the public highway is a fundamental right, subject to reasonable regulation. To restrict such right, the government must demonstrate a compelling interest. How do we know that drivers are competent to cross a road at a stop sign or flashing red signal, but lose their competence as soon as the flashing signal is switched to regular operation? Do the alleged benefits outweigh the loss of time and fuel, the air pollution, and the added risk of rear-end collisions?

Nine states allow pedestrians to cross a street against the red if they can do so safely and without interfering with vehicles. An eight year-old in those states is presumed competent to cross a street against the red light. Are the 195 million licensed drivers nationwide less competent than an eight year-old in Michigan?

The traffic signal was originally put up to replace the police officer on intersection duty. A police officer has the power to stop people for probable cause. If he stops someone without cause, he is abusing his power of office. Is the unnecessary delay at red lights on speculation that a driver will cause an accident an exercise of governmental power under color of law any less abusive than the action of a police officer who stops you on an unfounded suspicion that you are about to commit a crime?

Traffic signal installation should not only be avoided because federal guidelines advise it and because of the damage it causes, but because the courts have ruled that the government, to protect constitutional rights, must show it uses the least restrictive means of furthering its goals. A control device that causes traffic jams is unlikely to qualify as a least restrictive means of achieving the goals the government claims to pursue.

A SYSTEM IN DISARRAY An FHWA publication lists four principal goals of traffic control: minimum stops, minimum delay, maximum capacity, and maximum safety. We have seen how the system defeats those goals. It causes needless stops and needless delays, reduces highway capacity, and provokes accidents. The U.S. motoring public pays an estimated $123 billion annually in lost time, wasted fuel, and other vehicle operation costs. Billions more go to high-tech electronics to fight the symptoms of problems that public officials created in the early days of the automobile. The roots of the problem lie in the irreconcilable contradictions between the equal rights and responsibilities each individual has under common law and the unequal rights and responsibilities that the right-of-way rules dictate.

Traffic laws should forbid acts that cause danger, obstruction and nuisances -- acts that the common law forbids already -- but nothing else. A return to a system based on common law principles will be the ultimate and only way to give the public a safe, efficient, and cost-effective service.

Luckily, there is light at the end of the tunnel vision. A wider use of roundabouts during the last few years is gradually making travel safer and more efficient. A shortage of funds is forcing municipalities to put up inexpensive all-way stops where citizens clamor for a $120,000 set of traffic signals, although the all-way stop can be faulted for being unduly restrictive. And a brand new, age-old, zero-tech concept is in the offing. Experiments in the Netherlands have shown that running traffic in urban areas at 30 kilometers per hour, encouraging eye contact, eliminating traffic rules, signals, and other controls altogether — and leaving road users to their own devices, their own judgment, and their common law duty of reasonable care — has cut accidents, delay and congestion, and saved public funds. Visitors are invited to close their eyes and walk about without having to fear for their lives. So successful were those trials that other European towns are copying them. R

New Evidence on Drug Price Controls

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In my earlier *Regulation* article "Drug Research and Price Controls" (Winter 2002), I summarized my empirical findings on how pharmaceutical price controls in the United States would reduce industry investment into research and development. Price controls lower the expected returns on investments in pharmaceutical research, which leads firm managers to divert resources away from R&D and into other investment opportunities. This is basic Econ 101.

Critics of the pharmaceutical industry often argue that less research spending would not be so bad if it enabled Americans to better afford today's prescription medications. Their implicit argument is that the benefits associated with greater access would outweigh the costs of reduced future innovation. Recent empirical evidence, however, indicates otherwise and suggests that the United States may be *under*-investing in medical and pharmaceutical research.

In an article forthcoming in the *Journal of Law and Economics*, Carmelo Giaccotto, Rexford Santerre, and I estimated the short-run elasticity of pharmaceutical R&D investment with respect to real U.S. drug prices to be 0.583. This elasticity implies that, for example, a 10 percent decline in real pharmaceutical prices in period t will cause a 5.83 percent reduction in industry research expenditures in period t+1, ceteris paribus. Table 1 summarizes the declines that would accompany various price control scenarios in the United States.

The question of what this "lost" research and development will cost future generations requires that a longer time horizon be considered. Following an approach Joe Golec and I employed in a recent study published in *Managed Care*, if the annual real growth rate of industry R&D is g and the industry cost of capital is r, the present value of future R&D that is "lost" because of price controls is simply the policy-induced decline in research in period t+1 divided by r-g. Using recent estimates of total industry research expenditures ($33.2 billion), g (7.51 percent), and r (11.0 percent) in conjunction with approximations of the productivity of pharmaceutical R&D in terms of its contribution to life expectancies in the United States ($1,345/life year), we can calculate the cost of price controls in terms of present-value life-years lost. The results of those calculations appear in Table 2.

TABLE 1

Estimated Decline in R&D from Price Controls

REAL DRUG PRICES	R & D INVESTMENT
-10%	-5.8%
-20%	-11.7%
-30%	-17.5%
-40%	-23.3%
-50%	-29.2%

TABLE 2

Life-Years Lost from Price Controls

REAL DRUG PRICES	LIFE-YEARS LOST (MILLIONS)
-10%	-40.1
-20%	-77.8
-30%	-113.5
-40%	-147.1
-50%	-178.8

Before expressing those costs in dollars, three points require clarification: First, the assumption of a one-time decline in R&D is not necessary. While this assumption is consistent with the time-series model from which our elasticity estimate was obtained, declines in the post-policy research growth rate could also be modeled. For example, a 29.2 percent one-time decline in R&D would generate the same present value of "lost" R&D as a post-policy decline in g from 7.5 percent to 6.3 percent. Second, Frank Lichtenberg's estimate of the productivity of pharmaceutical research and development in the United States may not be appropriate for approximating future productivities; they could be higher or lower. In the absence of information on future productivities, however, this seems like a reasonable approach. Moreover, because of discounting, productivities far into the future will exert very little influence on the calculations. Third, the $33.2 billion estimate for total industry R&D is a conservative figure: it only represents the research and development expenditures of PhRMA-member firms. Thus, it excludes R&D for most small and medium-sized biotech firms: companies whose research investment decisions may be particularly sensitive to price controls. Indeed, some estimates have placed total industry R&D as high as $60 billion.

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TABLE 3

Long-run Economic Cost of Price Controls (in Trillions)

REAL DRUG PRICES	LIFE-YEAR VALUE $50,000	$100,000	$150,000
-10%	$2.0	$4.0	$6.0
-20%	$3.9	$7.8	$11.7
-30%	$5.7	$11.3	$17.0
-40%	$7.4	$14.7	$22.1
-50%	$8.9	$17.9	$26.8

The results in Table 3 convert the reduced future life expectancies (from price controls) into dollar cost estimates by assuming a U.S. life-year is worth $50,000, $100,000, and $150,000, respectively. As Table 3 illustrates, the long-run economic costs of imposing price controls on pharmaceuticals in the United States could be quite high. Thus, any benefits associated with improved access to today's medicines through price controls must be weighed carefully against the potential long-run costs. R

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