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## COVER STORY/TRANSPORTATION

### Rethinking the Urban Speedway

For decades, highway engineers focused on designing wider, straighter, faster roads. Now, moving traffic quickly is no longer the sole goal.

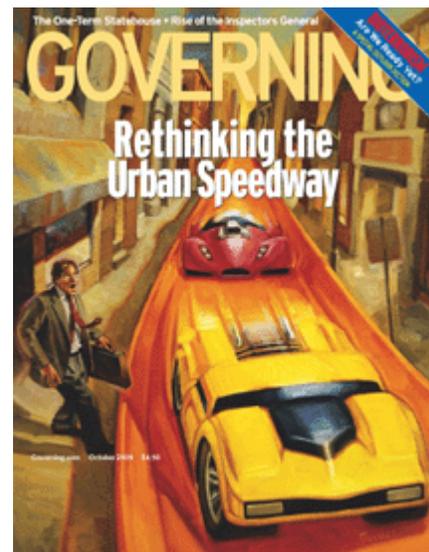
By CHRISTOPHER SWOPE

**T**ake a ride through Trenton with Gary Toth and Yosry Bekhiet, and you might conclude that these two highway engineers are the last New Jersey drivers who stick to posted speed limits. Bekhiet, behind the wheel of a state-issue Chevy Cavalier, accelerates up a ramp onto the city's downtown expressway, and then holds steady in the right lane at exactly 50 miles per hour. Toth, in the passenger seat, points out the gold dome of the state capitol as other cars fly past the white Chevy. "I drive this road at 50," Toth says, "and people pass me going 75."

State Route 29 through Trenton, like most roads in the United States, was built for speed. The engineers who designed it back in the 1950s had a hunch that motorists might race a little. So for safety's sake, they made the road a bit straighter and the lanes a tad wider than the speed limit suggested was necessary. Engineers at the time believed this to be prudent design — and many of their contemporaries would still agree with that assessment. For most of their long careers with New Jersey's Department of Transportation, this is what Toth and Bekhiet believed, too.

But lately, the two engineers have become convinced that supersizing Route 29 only made it more dangerous. Designing for the speediest drivers, they now believe, simply encouraged people to drive even faster. They note that recent accidents along a short stretch have killed six people. "The traditional engineering solution to road problems is to make the road wider, straighter and faster," Toth says. "Well, wider, straighter and faster is not always better."

Toth and Bekhiet have developed other objections to Route 29's design. The first is a matter of traffic flow. There are only a few spots where drivers can get on or off the highway. This means that Route 29 shoulders nearly all of the burden of moving cars through Trenton. When the road clogs up at rush hour or after a minor-league baseball game, drivers don't have much choice but to wait out the jam. Their second complaint is Route 29's location. It sits on an embankment along the Delaware River, completely severing downtown Trenton



from its waterfront. Thousands of state employees work in a building a stone's throw from the river's edge, but their view outside is all concrete and guardrails. "The Delaware River might as well be 100 miles away," Bekhiet says.

None of the engineers' criticisms of Route 29 are anything new. For 20 years, the city of Trenton has been begging the DOT to tear down this expressway. "It's the Indianapolis 500 out there," says Mayor Douglas Palmer. What is new, and is simply astonishing for anyone familiar with transportation policy to hear, is that it's the engineers themselves — finally — who are the ones saying it.

This is surprising because highway engineers have earned themselves a notorious reputation for dogmatic inflexibility. For half a century, they tended to apply a bigger-is-better formula to every road they worked on, in pursuit of a one-dimensional goal: moving as many cars as quickly and safely as possible. Along the way, DOTs ripped up neighborhoods, harmed main streets and destroyed scenic landscapes, typically foisting their plans and priorities on the public without seeking much public input. Local officials, citizen activists and even some of the engineers themselves came to call this mentality by a telling phrase: "Design and defend."

In the past five years or so, however, the priesthood of highway engineers has begun converting to a new religion. They're increasingly willing to consider road designs that slow cars down. They're learning to pay attention to pedestrians, bicyclists and other people who share the road with autos. And they're starting to listen to the public before, not after, they whip up their drawings. Design and defend is out. The new catch phrase is "context sensitivity."

Trenton's Route 29 is a good example of the new mindset. State engineers used to scoff at the city's idea of junking the expressway for a slower-speed urban boulevard. Now Toth, DOT's head of project planning, and Bekhiet, his lead engineer on this project, devote considerable energy to making it happen. The latest plans call for the new road to be meshed into a dense grid of new downtown streets. There would be lots of traffic lights, allowing pedestrians to cross between the city and the river. To be sure, the drive through Trenton would take longer — an extra one to two minutes, according to traffic modeling. But there's an upside, too: Trenton would get its waterfront back, as well as 18 acres of freed-up land to build a neighborhood of offices and condos that favors walking over driving.

DOTs are heaving bureaucracies, and deep within them there is still resistance to this philosophy, however. The Trenton project, Toth says, is more controversial within the 4,000-person agency than outside it. "Some people say, 'What? You're ripping out a freeway for community development? Are you out of your mind?'"

But a growing number of engineers these days are buying into an utterly radical notion, one that contradicts their own training and all their career experience. The idea is this: In some circumstances, their goal should be to move fewer cars, not more of them. "I didn't think about it for my first 25 years here," says Toth, a 32-year DOT veteran. "Our mission was to build roads. Why did we build roads? Because people have to get to their jobs, to shop, go to a ballgame. But what if we can't build roads fast enough anymore?"

## **THE COOKBOOK APPROACH**

The emergence of this new attitude is linked to the completion of the Interstate Highway System. Constructing a consistent national road network in the years following World War II required states to apply rigorously uniform road designs. When that work finally wrapped up in the early 1990s, DOTs turned their attention to fixing and expanding their state highways.

Those roads run through vastly different settings from Interstates — many main streets, for example, are technically state highways. Engineers nevertheless stuck by their Interstate-era calculations, detailed in a 900-plus-page tome known to all in their profession as the "Green Book." The Green Book actually allowed a good bit of design flexibility. But engineers always

read it to mean that they had to demand wide lanes, big shoulders and streetscapes optimized for driving quickly. "We had an army of literally thousands of planners, environmental analysts, designers and construction engineers who had built the Interstates for decades and who were used to this standardized approach," says Hal Kassoff, a consultant who served as Maryland's DOT chief from 1984 to 1996. "It was a collision course."

Over and over again, DOTs found themselves fighting with local governments, environmental groups, historic preservationists and community activists. The fault lines typically broke in a familiar way. Engineers wanted to widen roads, take out trees or sidewalks, and bulk up bridges, where opponents thought a simple repaving or minor bridge fix would do. Gradually DOTs began to see that they had to become more flexible if they wanted to finish projects rather than haggle over them. Scott Bradley, head of landscape architecture for the Minnesota DOT, puts it this way: "The old cookbook approach of using design guidelines and cranking it through the computer to tell us what the physical form of a road should be no longer flew."

The initial response within the highway engineering profession came to be known in the late 1990s as "context-sensitive design." No longer would engineers design roads as though only asphalt dimensions mattered. Now, they would take into account the surroundings. Is the road going through a scenic landscape? An urban neighborhood? A shopping district? Settings mattered. Process mattered, too: DOTs would ask stakeholders, typically the very people who had been holding up projects, how they wanted the roadway designed.

Suddenly, long-stalled road projects began moving again. The model that engineers everywhere pointed to was the Paris Pike in rural Kentucky. The original two-lane road ran through a historic landscape of rolling hills, stone walls and horse barns. Kentucky had long planned to widen and straighten Paris Pike into a blitzing four-lane freeway. Historic preservationists tangled the project in court for decades. Then along came context-sensitive design, and the engineers suddenly began accommodating their rivals. They routed Paris Pike to follow the hilly landscape, rather than barrel through it. Rock walls that had to be destroyed were reconstructed. Attractive guardrails were built out of timber. The end product, finished a few years ago, looks more like a 1920s parkway than a 1960s freeway.

Context-sensitive design often produced better results, but the process was still flawed. DOTs continued to view public outreach as an afterthought. Moreover, many engineers came to think of superficial treatments — brick-clad overpasses or medians planted with wildflowers — as wampum for buying off community opposition. Engineers preferred to fixate on aesthetics rather than meddle with their underlying assumptions about roadways.

A recent project in Connecticut, heralded as context-sensitive design, is an odd case in point. The state DOT built a downtown bridge in the city of Willimantic that is playfully presided over by four giant statues of frogs — an homage to the loud bullfrogs that surprised early settlers there in the 1700s. The "frog bridge" is now a popular local attraction. But don't expect to find anybody walking across it, says Norman Garrick, a University of Connecticut engineering professor. "It's still a hostile environment for pedestrians," he notes. "DOTs in most states still think that context-sensitive design has something to do with beautifying the road and aesthetic treatments. They've not come to grips with how roads that are designed like highways in the middle of cities affect the urbanity of the place."

**"Context-sensitive design" has evolved into "context-sensitive solutions." The difference is much more than semantics.**

That shortcoming is what engineers are now addressing. This is where the true revolution in thinking about highways begins. "Context-sensitive design" has evolved into "context-sensitive solutions." The difference is much more than semantics. "Design" assumed, as engineers always had, that transportation problems required some sort of construction to fix them. "Solutions" implies a broader, more objective view — one that may not result in any

road construction at all. It also suggests that community stakeholders might have better ideas for how to address problems than engineers do.

Consider how highway planning has changed in New Hampshire. The last time New Hampshire came up with a long-range transportation plan a decade ago, agency engineers controlled the agenda. "It was an in-house effort," says Ansel Sanborn, the DOT's chief planner. Now, a new 25-year plan is being drafted. Rather than dictate priorities themselves, the engineers have essentially turned the public-input process over to the well-respected New Hampshire Charitable Foundation. The foundation, it is hoped, can bring to bear a broader set of community values than highway engineers ever could. "Transportation people are very interested in building transportation projects," Sanborn explains. "The Charitable Foundation is very interested in building communities."

It's a similar story next door in Vermont. By 1995, historic preservationists had grown so fed up with the state Agency of Transportation that the Preservation Trust of Vermont published an entire book on how to fight the agency's decisions. Since then, the agency has overhauled its approach. It rewrote its design standards to accommodate the small-scale village charm that characterizes Vermont. Plus, citizen advisory boards now play a large role in deciding which road projects get started first. Even Paul Bruhn, the Preservation Trust's executive director, is impressed. "We do have an agency that is much more sensitive to our concerns now."

## HALTING A VICIOUS CYCLE

The new thinking is infiltrating nearly every DOT, as well as the engineering firms that states and localities hire as consultants. But nowhere has it reached the degree of complexity to which New Jersey is taking it.

That's largely because of Gary Toth, who is reshaping the bureaucracy's middle ranks with a new attitude. Toth constantly reminds his engineers that the Green Book is actually as flexible as a chili recipe — they just need to be willing to cook with different ingredients. Some 800 DOT professionals have gone through an extensive training course in context-sensitive solutions. When Toth sits down with his project managers, they question each other and brainstorm, much as doctors would in a hospital case study. "It's amazing," says David Burwell, a transportation consultant who has worked with New Jersey's DOT and several others. "There's much more of an intellectual inquiry now as to how to tackle specific issues."

Although Toth found this philosophy late in his career, he feels no remorse for the past. Engineers are problem-solvers, he likes to say. For most of his working life, engineers like him were expected to solve transportation problems within a limited set of auto-oriented parameters. But engineers, too, can roll with the changes. "Engineers can shift paradigms quickly," Toth says. "You just have to give them a different problem to solve."

Toth's new problem is an especially tricky one. His boss, Commissioner Jack Lettiere, is the nation's leading disciple of a fairly radical idea in transportation circles: that you can't build your way out of traffic congestion. This may be truer in New Jersey than in other places — but then again, New Jersey may be a national bellwether, too. Money for big road projects is scarce because New Jersey, like quite a few states, hasn't raised its gas tax in more than a decade. New Jersey also suffers, in a way, from its suburban maturity. Congested thoroughfares can't be widened without killing businesses, whose driveways and parking lots would be wiped out.

Lettiere wants Toth and his engineers to halt a vicious cycle that has spun out of control for years. In the past, DOT would see that a road was congested, and either expand it or build a new one. Then local governments, operating independently, would approve housing developments and big-box stores along those roads. Soon the roads would clog up again and the cycle would repeat itself. DOTs have always assumed they had no choice but to keep accommodating more and more cars. Lettiere now believes the exact opposite may be true. "To reduce traffic," he says, "maybe we have to reduce the number of trips on the highway."

To do that, Toth is going where no DOT has gone before. He is getting his engineers involved in local land-use planning. The goal is to make future development favor walking and driving alike. It's the ultimate test of the context-sensitive solutions mindset. Toth's "context" is much broader than usual: It's the housing developments, offices and stores located outside the state's right-of-way.

One example is Manalapan Township, in central New Jersey. Two state highways run through Manalapan: Routes 9 and 33. The first is already crammed with stores, parking lots and traffic. The second, absent intervention, will probably suffer the same fate. Recently, Manalapan's mayor asked Lettiere for help cleaning up Route 9. That fight is already lost, Lettiere responded. But Route 33 might still be saved.

So far, the planning work has focused largely on one developer's proposal to build a massive "lifestyle center" in a field of soybeans. The plan includes shopping, housing, a multiplex movie theater, a supermarket and ball fields. It's hit a wall of community opposition — largely on fears that it will clog Route 33 with traffic. DOT convened a couple of workshops to sketch out alternative ideas for how to lay out the project. The sessions brought the developer together with local transportation, planning and zoning officials, in addition to neighborhood, civic and business groups.

The daylong workshops, in March and June, produced a revised conceptual plan. The new plan emphasizes pedestrian-friendly streetscapes. It also encourages mixing land uses so that people can go from a store to a restaurant without getting in their cars. Toth is careful to note that Manalapan asked DOT to hold — and to pay for — the workshops.

Toth has a dozen other projects like this one in the pipeline. A key principle keeps emerging that breaks yet another orthodoxy of the engineering world. For years, engineers designed road networks to flow a bit like blood vessels, with smaller roads feeding into thicker ones. (In fact, the Green Book term for a major thoroughfare is "arterial.") Toth has come to believe that engineers are putting too much pressure on these major roads. He's convinced that what would work better is something more like a grid — where drivers have lots of options for getting around, rather than one overburdened highway. "We've created a situation where everyone who wants to go out for a bagel or newspaper has to go out to the same road," Toth says.

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That theory is getting a test in the borough of Flemington. Routes 202 and 31 are the main drags through town, both lined with strip malls. They carry nearly all of the traffic moving through the region, as well as local shopping traffic. For two decades, DOT had intended to build a bypass. The plan was for a four-lane separated freeway, expected to cost \$150 million. DOT is too broke for that kind of a project now. And even if the agency had the coin, Toth believes that a bypass would be a waste of money. It would give drivers only one way around a traffic jam, rather than several.

Through another series of public workshops, the plan has been reworked. The bypass is gone. In its place is a two-lane boulevard that intersects with many side streets. DOT will also pay to beef up some county roads in order to further disperse traffic and ease the burden on Routes 202 and 31. In all, this costs about half as much. Mary Melfi, a Flemington councilwoman, is pleased with the change. "Everything in New Jersey is a highway," Melfi says. "DOT has always been about six-lane highways, and they're not doing it anymore. They'd rather build 14 miles of small roads than a few miles of big ones."

To be sure, New Jersey will still widen roads when it makes sense and when there's money to pay for it. "We're not going soft here," Toth says. "We're still worried about the concerns of the motoring public." But the job of designing highways couldn't be more different from when Toth started with DOT 32 years ago. Engineers don't have to be just kinder and

gentler. They've got to be creative. "If you follow the book, that's not design," Toth says. "That's just following the book."

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