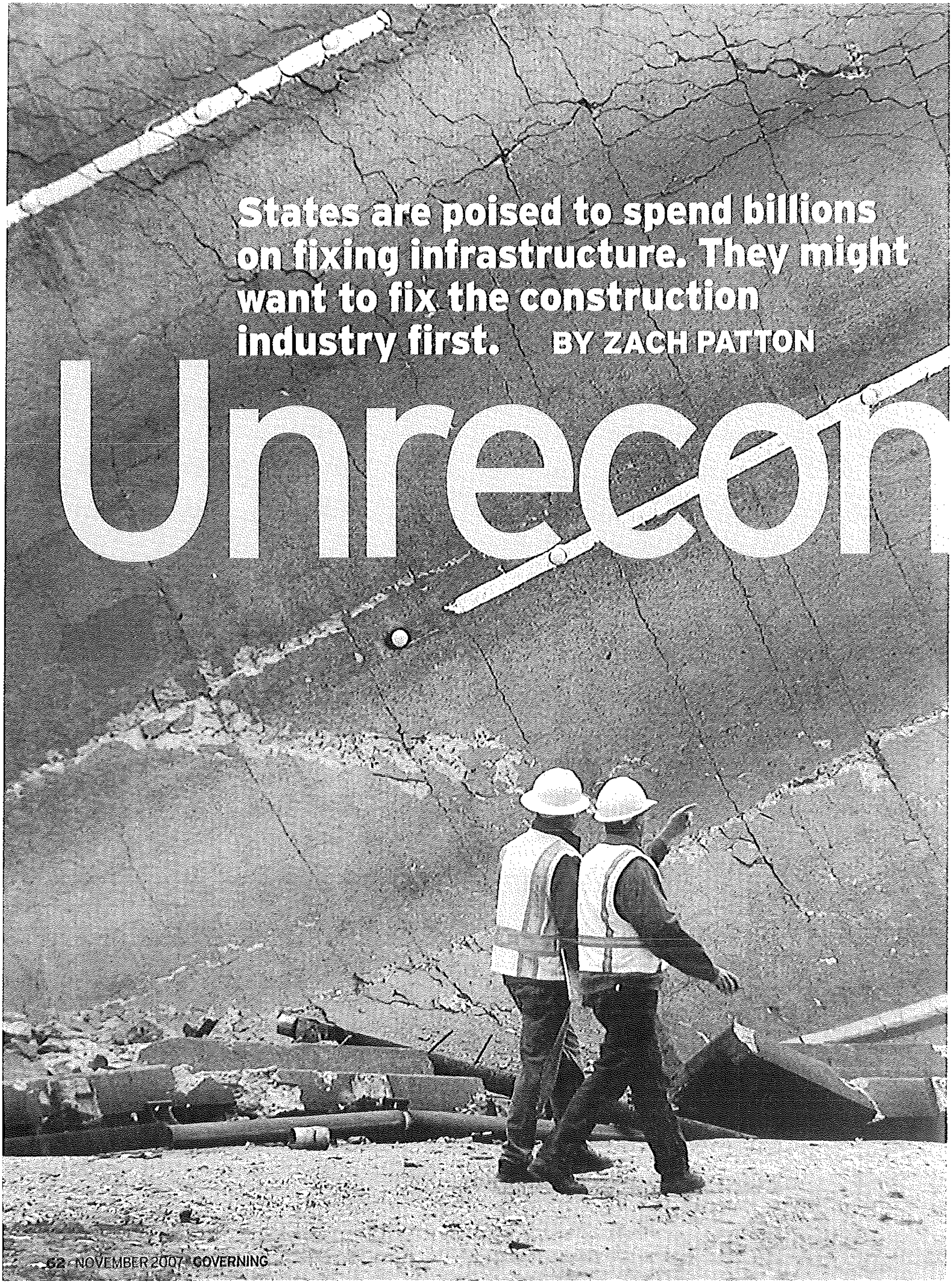
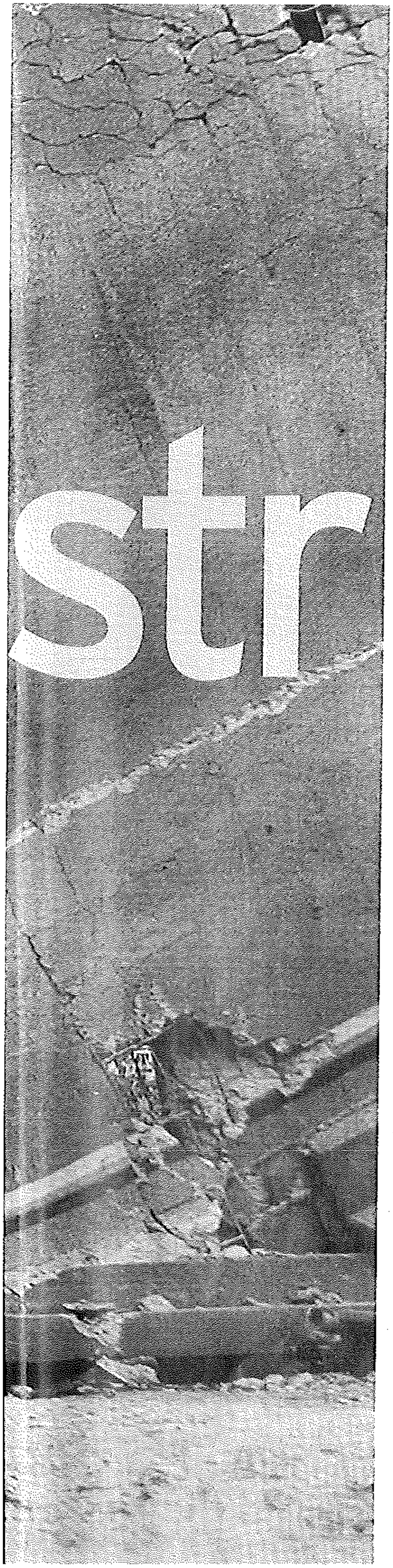


Unrecon

States are poised to spend billions on fixing infrastructure. They might want to fix the construction industry first. BY ZACH PATTON



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BEFORE DAWN ON APRIL 29, THE DRIVER of a gasoline truck in Oakland, California, lost control of his rig and flipped it on an Interstate connector ramp. The tanker was carrying 8,600 gallons of fuel, and it exploded into a white-hot blaze that licked the steel underside of a roadway above it. A 168-foot section of that structure buckled and collapsed. It was an important strand in the tangle of ramps exiting off the Bay Bridge from San Francisco, known locally as the "MacArthur Maze." Caltrans, the state transportation agency, warned Bay Area drivers to expect traffic delays for months.

The crisis turned out a good bit better than that.

Caltrans offered construction companies a series of bonuses for getting repair work done fast and went on to sign a creative contract with C.C. Myers Inc. The firm offered to take the job for a base price of just $867,075. For each day it beat a state-set deadline, the company would receive an additional $200,000; for each day work went past the deadline, the firm would lose $200,000. Just 15 minutes after winning the bid, C.C. Myers' engineers began arriving at the site. The firm worked around the clock and finished the job in just 18 days—earning it a $5 million bonus. Although the final tab came in a bit higher than the $5.2 million Caltrans had initially estimated, gnarled traffic was moving smoothly again sooner than anyone had imagined possible.


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If the quick work in Oakland sounds unusual, it's because construction projects so often stumble like one located just 30 miles north of the Maze. Caltrans opened a new northbound span on the Benicia-Martinez Bridge in August—seven years late and, at $1.3 billion, more than four times the estimated cost. Construction was plagued by setbacks, including an unexpectedly soft rock bed under the Carquinez Strait and the fact that pile-driving noise was killing fish. Blown deadlines and escalating costs of this sort increasingly seem normal and maybe even expected. Many states and localities seem to accept them as simply part of the building process.

That's a big problem because in the aftermath of the I-35W bridge collapse in Minneapolis, states are poised to make some big infrastructure investments. As that calamity made clear, many of America's roadways, bridges and tunnels are in critical condition after decades of deferred maintenance. In some places, the needs are especially pressing. Massachusetts needs to spend $17 billion on repairs, according to one report. In Pennsylvania, the tab for bridge maintenance is $11 billion. In New Jersey, it's more than $13.5 billion. Overall, the American Society of Civil Engineers gives the nation's infrastructure system a grade of "D," and the group says that fixing the country's existing problems is a job with a $1.6 trillion price tag.

As states redouble their efforts on maintenance, the trick will be to produce more successful projects such as the MacArthur Maze and fewer tarnished ones along the lines of the Benicia-Martinez Bridge. It won't be easy. Issues of cost overruns and missed deadlines have plagued construction projects for years. And transportation departments will continue to deal with a construction industry that is, in many ways, antiquated, inefficient and wasteful. Minnesota, still shaking off the shock of seeing a key transportation asset crumble into the Mississippi River, is now grappling with its replacement cost soaring toward $400 million. That's 57 percent higher than the amount the federal government set aside for the bridge. And construction hasn't even begun yet.

Since the bridge tragedy in Minneapolis, the public is beginning to see deteriorating infrastructure as an issue that's urgent, nonpartisan and worth spending money on.

Lots of Little Digs

For most public officials of this generation, the poster child of the public works project gone awry is the Big Dig. Finished five years late and many billions over budget, the tunnel under Boston was the nation's most expensive highway project ever. Yet a perusal of recent capital projects across the country reveals a growing number of Little Digs, in transportation facilities and beyond:

• Miami International Airport opened a new 1.7-million-square-foot South Terminal at the end of August. That was two-and-a-half years behind schedule and more than $300 million over budget. A review of the project found that progress had been mired in thousands of change orders and infighting among subcontractors.

• The cost of the new Los Angeles County/USC Medical Center has ballooned by 22 percent to $899 million—the priciest project in county history—and the center is scheduled to open a year late. County officials blame the trouble on contractor errors that allegedly forced fixes to the hospital's plumbing and ventilation systems.

• An expansion and renovation at the Indianapolis downtown library is more than two years behind schedule and more than 50 percent over budget. The final cost could be as much as $155 million, a figure that doesn't include legal fees in a court proceeding now underway to determine who's at fault for the increased project costs.

• Chicago's Dan Ryan Expressway is reopening this month, rebuilt at a cost that's nearly twice the original $550 million estimate. The project is on schedule, but the Illinois DOT attributes runaway costs to design changes and, among other things, skyrocketing expenses for materials.

As in Chicago's case, many cost overruns lately are blamed on the rising cost of concrete, steel and wood. That is part of the problem. Building booms in China and India have created worldwide shortages of construction materials. Prices have spiked even higher in the United States since rebuilding began after Hurricanes Katrina and Rita. Other factors, such as reconstruction in Iraq and higher gasoline prices, also affect the construction industry's bottom line. From April 2004 to April 2007, the overall cost of construction materials in the United States increased by 14.8 percent.

But that's only part of the story. Also at issue is an outdated, inefficient construction industry that can make it nearly impossible for states to control costs. Barry LePatner, a construction lawyer in New York City, says it's an industry that must be reinvented if states ever want to start reining in their project costs. If there's a guru of construction-industry reform, it's LePatner. An attorney in the industry for more than 30 years, he's the author of the recent book *Broken Buildings, Busted Budgets: How to Fix America's Trillion-Dollar Construction Industry.* He also tracks news stories of project cost overruns on his Web site, www.brokenbuildings.com.

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Just 15 minutes after winning the MacArthur Maze bid, engineers began arriving at the contruction site.

According to LePatner, the construction industry's first problem is fragmentation. Construction companies make up "the last mom-and-pop industry in the United States," he says. It's an industry comprising hundreds of thousands of tiny, specialized companies—the same basic makeup the field has had for a century. Of the nation's 7.6 million construction workers, 92 percent work in firms of no more than 20 people. Even the largest companies serve predominantly as overseers on a given project, working with teams of subcontractors. Because the industry has remained so splintered, it has never developed the innovation and economies of scale that every other major field has. The amount spent on new technology in construction is the lowest of any industry. "Nobody can afford to take risks," LePatner says. "Because these firms are so small, there's really no capital for them to draw on. The goal is just to stay around year after year."

Fragmentation in the construction industry stymies productivity. American industries have, in aggregate, increased the productivity of each worker by about 250 percent since 1964, according to the U.S. Bureau of Labor Statistics. But in the same time period, per-worker productivity in the construction industry dropped by 22 percent. Lack of coordination among all the different companies that may be working on a given project also inhibits efficiency. A 2005 survey by University of Pennsylvania researchers, published in the *Journal of Construction Engineering and Management,* found that up to 50 percent of all labor on construction sites is wasted because late deliveries and a lack of communication left workers idle.

Wayne Crew doesn't believe the situation is quite as dire as LePatner suggests. Crew is the executive director of the Construction Industry Institute, a consortium of contractors, non-construction corporations and government agencies based at the University of Texas at Austin. He agrees that fragmentation in the industry keeps innovation from spreading as quickly as in other industries. But innovation is happening nonetheless, he says, in areas such as materials management and preventing accidents. "There are tools in the industry that can keep a firm's productivity up, and people are more and more embracing them."

Regardless, Crew says, the onus is on states and municipalities to keep construction costs down by keeping change orders to a minimum. "The owner ultimately has the responsibility to define the scope of the project before it starts. The data suggest that good upfront planning to define the scope, coupled with effective change control on the ground, can control 90-plus percent of the cost growth."

New Contracting Methods

What seems clear is that if states and localities want more projects to finish on time and on budget, they'll need a new relationship with the construction industry. On government's side of that pairing, project managers must work more aggressively to anticipate problems before they happen. "Managing your assets today means being knowledgeable about the construction process," says Michael Pagano, the interim dean of the College of Urban Planning and Public Affairs at the University of Illinois at Chicago, and a national expert on transportation and infrastructure. "Project monitoring has become much more important. States have to be more cautious, and they have to be more vigilant."

As Pagano sees it, part of the new relationship requires tighter contracting when it comes to big construction projects. "Contract clauses are starting to get a little more powerful," he says, noting that some public contracts these days penalize firms for finishing over budget by making it harder for them to win another contract later. Project managers also need to manage expectations, especially with the media, when it comes to the most complex construction jobs. Pagano asks: "Is a 5 percent increase 'over budget'? Is a month 'late'? Of course it depends on the project. But that's what states are still trying to figure out."

One place states will be looking to for answers is Missouri. Officials there are implementing a novel plan to repair or rebuild 800 bridges in just five years. Already developed before the Minneapolis bridge collapse, Missouri's program involves having contractors front the $400 million to $600 million in infrastructure repairs. The state will then reimburse the companies over the next 25 years using federal bridge funds. And there's a warranty: The private firms are required to keep the bridges in good shape for those 25 years. There are a couple of challenges. For one, the plan addresses only smaller, rural bridges—not any of the state's larger spans. And there aren't many firms that could make the kind of commitment Missouri is asking for. Still, states will be watching to see if this unique financing structure pays off.

Meanwhile, states continue to experiment with a different contracting method known as design-build. That's a form of project management that gained popularity in the 1990s, but it's actually a throwback to the way the construction industry was organized a century ago. With a design-build contract, there's one "master builder" who handles the entire project from inception to completion. Projects from the Egyptian pyramids to the Brooklyn Bridge were built this way. But as construction became more complicated at the turn of the 20th century, firms became more and more specialized, and a project site became a conglomeration of several different companies.

Some states see promise in a return to the design-build approach. It can help provide price certainty, since the government sets the amount it's willing to spend. The contractor assumes the risk for cost overruns. And design-build can speed delivery time, since builders can begin work on a project before the designs are finalized. This contracting method is estimated to save 6 percent on construction costs and cut delivery time by 12 percent, according to the Construction Industry Institute. In recent years, several states have begun implementing design-build contracts for certain projects, including roads and bridges. This year alone, 10 states, including Colorado, Iowa, Mississippi, North Carolina, Texas and Washington, passed laws either creating or expanding their authority to use design-build.

But while design-build may streamline construction, it has its drawbacks. First, because a single contractor handles design and implementation, the process involves much less competition than states traditionally have required. "There's a real value to ensuring that there's more than one set of eyes or one group involved," says Pagano. "With competition, you get competitive oversight. You're more likely to identify problems when there are other groups involved." For that reason, quality control becomes a bigger concern. And design-build also raises questions about graft. "You probably can save time and money," Pagano says, "but you may end up glossing over some of the possible flaws. And you possibly open the process up to more corruption and favoritism."

The Bonus Strategy

Then there's the bonus-incentive approach, which worked so well on the MacArthur Maze reconstruction in California. To be sure, that was something of a special case. C.C. Myers was a construction firm with a history of delivering on time, and the firm was working on a relatively straightforward job under daily scrutiny from the local media. Plus, the urgent nature of the project encouraged Caltrans to focus intensely on collaborating with the contractor. "We worked closely with them throughout the process," says Bay Area Caltrans spokeswoman Lauren Wonder. "We brought in small businesses to meet with the contractors to let them know what services they were able to provide. They could literally shake hands across the table and see how they could work together." State engineers even flew to Arizona to inspect steel girders being built there before they were shipped to the project site.

Of course, California reserves that level of attention for its most high-profile construction projects. And the state utilizes contract bonuses only in emergency situations, when speed and cost control are extremely important. "It works best for more of a distinct project we need to get done quickly," says Wonder. "We don't do that as a general practice." Some lawmakers in California, impressed by the Maze project, have begun advocating for more bonus-based contracts on large projects. A similar approach might help other states get a handle on the runaway costs of construction.

In a way, there exists today a unique opportunity for reform. Since the Minneapolis bridge tragedy, the public is beginning to see deteriorating infrastructure as an issue that's urgent, nonpartisan and worth spending money on. But political support will wither quickly if the new focus on road and bridge maintenance merely produces one more boondoggle after another. "If we contract the same way we have been, we're going to be losing hundreds of billions of dollars," says LePatner. "We can't turn over that kind of money without first changing the rules."

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