Next month, a major bridge over the Schuylkill River just outside Philadelphia will be declared too unsafe for trains to use. Its wood ties are rotten and officials fear the rails, expanding in the summer sun, will pull the trestle apart.

The Southeastern Pennsylvania Transportation Authority, or Septa, says the bridge hasn't been fixed because Septa is being required to spend money on a different safety program. The other program is designed to prevent trains from crashing into each other.

Both goals—avoiding bridge failures and avoiding train crashes—are top priorities, Septa says. But Septa argues that basic repairs are its more urgent need.

"We could have great signals," says Rich Burnfield, Septa's chief financial officer. "But we might not have safe bridges to run those trains over."

Similar complaints are being made nationwide, from New York's sprawling transit system, to the tiny 13-station Rail Runner Express in New Mexico. The rail networks are fighting a federal requirement to install anticrash systems by the end of 2015. They argue their systems are already safe and that the requirement siphons money from repairs. They want Congress to push back the deadline.

On Wednesday the Senate Commerce Committee will hold a hearing on railroad safety, including the progress on installing anticrash gear. Overall, the mandate applies to at least 25 U.S. passenger systems carrying nearly 564 million passengers annually.

Central to the debate is the delicate matter of putting a
The dollar value on saving a life. It is an age-old regulatory predicament—namely, whether or not spending to make one thing safe steers money away from addressing a more serious threat elsewhere.

The effort to calculate the value of lifesaving is a growing area of research among regulators and economists alike, says Michael Livermore of the Institute for Policy Integrity at New York University's School of Law. The research enables "finer distinctions" about the cost that society is willing to bear to lower risks, he says.

In the case of the upgraded train signals, the Federal Railroad Administration, which regulates passenger and freight trains, in 2009 put the installation cost at 15 times the economic benefits from prevented accidents. The FRA came to this number by applying a standard government formula.

Advocates for the new rules include Deborah Hersman, chairman of the National Transportation Safety Board. She draws a parallel to the time when NTSB pushed airlines to add collision-avoidance systems.

"We've virtually eliminated midair collisions," Ms. Hersman says. "They said it was too expensive and they couldn't do it. It was mandated, it was implemented, it changed countless lives."

A handful of serious rail crashes—including a 2008 head-on collision that killed 25 people—prompted Congress to require the new signals. The FRA says the system could prevent 52 accidents a year, ranging from nonfatal rail-yard mishaps to deadly train crashes.

For the railroads, "There is always going to be an excuse not to do something that it's going to cost them money," says Allan Moran, whose daughter died in the 2008 crash, which occurred near Los Angeles when a Metrolink commuter train ran a red light.

If the new requirements had been in place then, Mr. Moran says, "Our daughter might be alive today."

The rail anticrash technology, Positive Train Control or PTC, is designed to automatically stop a train even before it runs a red signal or gets into other dangerous situations. This is an improvement over most current systems, which can warn train operators of danger, and in some cases automatically halt trains, but still allow the possibility of collisions.
This can lead to human error. In the 2008 Metrolink crash, investigators found the train operator was sending texts around the time he ran the red light.

Other parts of the world, including Europe, Japan and China, have PTC-like systems in place. The NTSB says the new systems would have prevented at least 15 accidents since 2005 that killed 50 people and injured 942.

"As sure as the sun rises and sets, we will see these collisions occur," the NTSB's Ms. Hersman says. "I think the question that certainly the commuter [railroads] have to ask themselves is: Are they going to be the next Metrolink?"

The question took on renewed urgency last month. PTC wouldn't have prevented a Metro-North derailment in Connecticut that injured more than 70 people, the NTSB said. But a major freight-train collision in Missouri—which destroyed a nearby bridge—likely could have been prevented with the more robust signals, the NTSB said.

The FRA puts the cost of upgrades at up to $13 billion for passenger and freight railroads. The nation's transit agencies' share for the new signal systems is expected to top $2 billion. Overall, the transit agencies have a backlog of around $12.6 billion for commuter-rail upgrades (as opposed to subway, light-rail or buses), in order to achieve a state of good repair, the Federal Transit Administration reported in 2010. The FTA oversees municipal and regional mass-transit systems.

It is tough to draw direct comparisons of train passenger safety to other types of travel, according to the Department of Transportation. For instance, the definition of a travel fatality varies. With automobiles, it is a death from injuries up to 30 days after a crash; for trains it is up to a year.

The American Public Transportation Association, an industry group, says that, for cars, about 1.4 people died for every 100 million passenger-miles traveled from 2003 through 2008, federal data show. For commuter rail, the figure was 0.06 deaths and for Amtrak, 0.03.

Overall in the past decade, FRA statistics show, 56 passengers and employees have died in incidents on mainline track, not including people or cars struck at grade crossings.

Trade groups for both freight and passenger railroads have urged lawmakers to push back the 2015 deadline for the new signals. "These are very complex systems," says APTA's Rob Healy. "They're not systems that you can just buy at Radio Shack off the shelf."

Railroad signals vary widely, their complexity determined by the type and speed of the trains they regulate, as well as congestion. Areas without signals are known as "dark territory." On these stretches, thousands of miles of track nationwide, a tower operator keeps a list of trains on the rails, and train operators radio in to ask permission to move ahead. Dark territory even includes some suburban commuter-rail routes such as the eastern reaches of the New York Metropolitan Transportation Authority's Long Island Rail Road.
Some railroads say they can meet the deadline, including Metrolink and Amtrak. On the other hand, Chicago-based Metra, the second-busiest commuter railroad after the LIRR, is already assuming Congress will delay the PTC mandate by three years—something Congress considered last year.

Metra recently shifted some $14 million away from its PTC budget to fund repairs instead. A Metra spokesman said the funds would instead be used to make improvements in the rail yards and to fix up aging train stations.

New York’s MTA has said PTC installation costs will grow to at least $750 million and that it is delaying other repairs as a result. For instance, it postponed electrical upgrades along its Harlem Line that would let it run more and longer trains during rush hour.

The Obama administration has shown sympathy to calls for relief. In 2011 a then-adviser to the administration, law professor Cass Sunstein, singled out PTC in a Senate Homeland Security Committee hearing as a rule with costs that are "unambiguously" greater than its benefits.

Executive orders signed by Presidents Ronald Reagan, Bill Clinton and Barack Obama require federal agencies to perform cost-benefit analyses when imposing some new rules and mandates. For regulations designed to prevent fatalities, that means calculating the economic benefit of preserving a life.

In the past, to calculate the value of saving a life, the government used the value of the wages a person would have been expected to earn over the remainder of a lifetime, says W. Kip Viscusi, a professor at Vanderbilt University who consulted with the Reagan administration to overhaul life valuations in the early 1980s. At Mr. Viscusi’s urging, the federal government adopted a measurement known as the "value of statistical life," or VSL—roughly speaking, the amount of money Americans find reasonable to spend for a given reduction in the risk of death.

The switch to VSL raised the dollar value on preserving a human life. Among other things, that made costlier safety regulations easier to justify on economic grounds.

"Agencies I think latched onto this," Mr. Viscusi says. "Not only is it good economics, but it increases their benefits by a factor of 10. So it makes their regulations look more attractive than they otherwise would." The calculation is now a standard part of the cost-benefit analysis that occurs across federal agencies when they issue rules deemed to be "significant" by the Office of Management and Budget.

To calculate the value of life for a given government regulation, agencies use wage, consumer-purchase and job-safety data to calculate the premium already built into economic data to account for relative riskiness. So economists deduce from people's willingness to pay for safety features—say, air bags—how much they value lowering the risk of death.

From there, economists extrapolate the VSL, the economic value of saving a single life. Back in 2009, the Department of Transportation put that number at $6 million; today it is...
calculated at $9.1 million.

"Their survey is pretty much on target," Mr. Viscusi says of the DOT's current VSL value. "It's about an order of magnitude larger than what a railroad would pay in a court case if they killed somebody." The balance that must be struck, he says, is that the sums might potentially be spent on "other things that would enhance health more than that expenditure."

The NTSB's Ms. Hersman says that the safety system's benefits outweigh such monetary concerns. "There's always arguments about, 'The technology is not there,' or, 'The money's not there,'" she says. "But at the end of the day, we have to make a commitment, and a choice. We see this over and over again in all modes of transportation."

Positive train control isn't a new concept, but it gained urgency after Sept. 12, 2008, when a Metrolink train rolled out of the station in Chatsworth, Calif. As it motored ahead, its engineer began texting a friend, investigators found.

The train ran a red light and slammed into a freight train. The engineer died, along with two dozen other people. Another 102 were hospitalized.

Within months, lawmakers led by Democratic Sens. Dianne Feinstein and Barbara Boxer, both of California, focused on technology that could have prevented the accident—PTC. In 2008, former President George W. Bush signed a law requiring railroads to install the systems by the end of 2015.

Metrolink is one of PTC's strongest backers. "Every year it gets delayed or not put in, someone dies who did not have to," says Richard Katz, Metrolink's board chairman. Referring to other rail lines, he says: "If there's another project on their list that has the potential to save lives the way this does, they should consider that."

Other railroads say that even though their existing systems don't meet PTC standards, an accident like Chatsworth wouldn't have occurred on their lines.

"I don't ever want to paint anything as perfect," said Howard Permut, president of the MTA's Metro-North rail line, in an interview several months before the railroad's May 17 derailment in Connecticut, which is believed to be the result of a broken rail joint. "There's always human error. Things happen." But the MTA's current system, he said, "has been proven to be an extremely safe system."

Regarding his railroad's May 17 crash, he says, "It was a very tragic event, but it would not have been prevented by PTC." He notes the NTSB has affirmed that.

He and others point to a key difference between Metrolink's original signal system and theirs. In Chatsworth, Metrolink's signals worked properly: A red signal warned of the approaching freight train. But the system contained no fail-safe to slow or halt the Metrolink train when it barreled through the red signal.

Such an accident would be virtually impossible on some of the busiest commuter-rail lines,
including Metro-North, and large sections of LIRR, Metra and Septa’s territory, executives from those lines say. Already, they say, their current systems will trigger brakes or cut train power on much of their track if trains don’t respond to alarms or ignore red signals.

But these systems, known generally as "automatic train control" and "cab signaling," aren’t as aggressive as PTC, and they aren't necessarily systemwide. And collisions—in sections without those fail-safes—still occur. Of the 15 crashes since 2005 that PTC could have prevented, according to NTSB, one was a 2005 Metra crash that killed two and injured 117 when an engineer improperly interpreted a signal. In 2006, two Septa trains collided, injuring 38, when an engineer disobeyed a signal and failed to stop his train in time.

The engineers couldn't be reached for comment. A union representing the two men declined to comment.

In Pennsylvania, passengers on the route affected by next month's Schuylkill River bridge closure are bracing themselves. Sarah Pantelidou says she will probably drive to work more often. Deferred maintenance "made financial sense for Septa, I assume," she says. "But this day was going to come."

Septa will offer passengers like her a bus alternative. But David Burke, another regular on the train, says: "I think I'm going to walk it instead."

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A version of this article appeared June 18, 2013, on page A1 in the U.S. edition of The Wall Street Journal, with the headline: Rail Safety and the Value of a Life.