

Bloomberg Businessweek

WEDNESDAY, OCTOBER 4, 2021

Just-in-Time Manufacturing? Not With Rickety U.S. Infrastructure

Tortured logistics at one factory in Pennsylvania reveal the economic toll of strained highways and ports.



Backed-up traffic on Interstate 81, just before the southbound exit for West Hazleton, Pa.

Photographer: Warren Ruda/Hazleton Standard-Speaker/AP Photo

By Mike Dorning

Every vehicle that comes off the assembly line at [Volvo Construction Equipment Corp.](#) in central Pennsylvania is a test of America's highways, rail lines, and ports. And too often they let the company down—slowing the influx of global supplies that feed its main U.S. production facility, which builds wheel loaders, soil compactors, and other industrial vehicles.

During a stretch in April and May, bad traffic on nearby Interstate 81 delayed the arrival of steel plates from Georgia on three occasions. Such incidents send senior production controller Mike Middaugh to his computer to test alternative assembly schedules, given what parts the factory has on hand and what other deliveries might be accelerated.

"It's very much a puzzle. You've got all these pieces," Middaugh says. When he succeeds in rejiggering production, he can see the impact from his perch overlooking the factory floor. Mechanical tuggers—a sort of powered cart—scutter around pulling vehicle frames off assembly lines as output is resequenced.

It all takes time and adds costs, if the flow of parts can even accommodate a switch.

Sometimes, after hours of poring over spreadsheets and testing multiple alternative scenarios, Middaugh finds the only answer is to stop production. For an operation that relies on just-in-time deliveries of parts and materials, delays have at times halted the Volvo plant's production for half or even a full day, according to the company, which is part of the [Volvo Group](#).

At Volvo's factory in Arvika, Sweden, which also makes wheel loaders, the company regularly schedules deliveries of German-made engines as little as one hour before the first engine in the shipment is needed, says Gustavo Casagrandi, a vice president and general manager of Volvo's Shippensburg, Pa., operations.

"We could never do that here," Casagrandi says. "We would have to be continuously stopping the line with 250 people not working."

The disruptions showcase why business leaders and local officials across the country are hoping President Joe Biden and Congress can in coming months finally [deliver a major infrastructure investment package](#), after years of political bickering in Washington that's



Volvo Construction Equipment's assembly line in Shippensburg, Pa.

Photographer: Michael A. McCoy/Bloomberg

stymied previous attempts.

"It probably costs 5% to 10% of productivity," Stephen Roy, president of Volvo CE's North America region, says of infrastructure deficiencies. "We're shutting the plant down. We're idling the workforce."

Biden, nicknamed [Amtrak Joe](#) for his long practice of commuting daily to Washington from Wilmington, Del., by train, has made upgrading national infrastructure a [priority](#), highlighting the damage to American economic competitiveness from decades of underinvestment.

The U.S. dedicates 1.6% of gross domestic product to infrastructure spending, compared with an average of 2.9% among European nations, 3% by Japan, and 6.1% by China, according to the Group of 20 Global Infrastructure Hub.

The costs to productivity and corporate bottom lines have been clear.

- A quarter of U.S. bridges need significant repair or cannot handle current traffic, according to a 2018 report from the Department of Transportation.
- Traffic on interstates by tractor-trailer trucks surged 31%, measured per lane mile of highway in the system, from 2000 to 2019, according to [TRIP](#), a transportation research group supported by insurance companies and businesses involved in improving or repairing transportation systems.
- Freight truck delays increased 77% from 2000 to 2019 in the nation's 494 urban areas, according to the [Texas A&M Transportation Institute](#).
- The trucking industry sustains \$74.5 billion in direct costs annually from delays on the national highway system, showed a 2018 report by the [American Transportation Research Institute](#), which is funded by the industry.
- Fifty-four percent of senior executives at middle-market companies say infrastructure deficiencies directly hurt their businesses, according to an April survey for the [U.S. Chamber of Commerce](#).

Volvo's Shippensburg facility is just off I-81, a crucial freight artery that runs from Tennessee to Canada, largely along the Eastern Continental Divide. Part of the Eisenhower administration's historic

highway-building program, I-81 was constructed in the 1950s and '60s. With only two lanes in each direction in most parts, the road often gets clogged, and dangerously short entrance and exit ramps contribute to frequent major collisions. These can snarl traffic for four hours or longer, according to Volvo.

I-81 is in part a victim of its own success. The route is close enough to densely populated East Coast metropolitan areas to serve as an attractive location for distribution centers. Franklin County, which encompasses part of Shippensburg, has added 10 million square feet in distribution centers in recent years, with two more 2 million-square-foot warehouses planned to open by the end of the year, says Mike Ross, president of the local economic development authority. Each one becomes a hub for truck traffic.

"It's our lifeblood, but in another sense it's our albatross," Ross says of I-81. "It's a dangerous highway. There are life-altering accidents that occur on that highway every day. That then creates backups, which impact the movement of parts for companies like Volvo," he says, adding that he spent two hours stuck behind one such accident on Mother's Day weekend this year.

The 233-mile segment of I-81 in Pennsylvania in 2019 averaged almost 11 accidents a week that shut down a travel lane, and almost one a week in which the lane was closed more than four hours, the state's department of transportation says. Things are even worse in Virginia, home to the longest stretch of the highway. Its 325-mile section averaged more than 33 lane-closing accidents a week, according to the state's transportation department.

Democratic Senator Mark Warner of Virginia, one of the negotiators on a bipartisan \$550 billion, five-year infrastructure framework that's been endorsed by Biden, anticipates some of his state's share of the funding would go to improvements in its section of I-81, says his spokesperson Rachel Cohen. Alexis Campbell, press secretary for the [Pennsylvania Department of Transportation](#), says the same applies for her state. Pennsylvania stands to receive [\\$11.3 billion](#) and Virginia [\\$7 billion](#) in federal highway aid under the bipartisan infrastructure bill, according to computations released by the White House.

The package would push federal infrastructure spending to the highest level as a portion of GDP since the early 1980s, when the build-out of the interstate highway system was being completed and federal grant programs for local water systems were winding down, says Adie Tomer, a senior fellow at the Brookings Institution. "It really is historic in scale," Tomer says. "We are going to be approaching New Deal-era investment at the federal level."

But there's [no guarantee](#) a bill gets passed by both chambers of Congress. Democrats are tying the bill to the fortunes of bigger, separate legislation to [ramp up social spending](#), with that outcome uncertain.

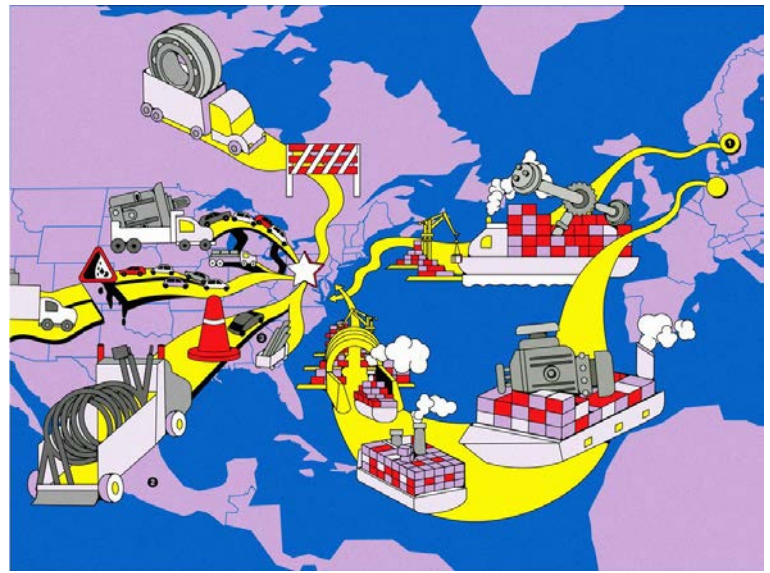
It takes 1,574 parts to assemble a Volvo L90 wheel loader, a staple of the Shippensburg facility. Engines come from Germany, transmissions from Sweden, and the counterweights providing equipment stability and lifting efficiency from China. The main chassis harness is made in Arizona, the hydraulic motors and pumps in Iowa. And the custom-fabricated steel plates that the factory's welders use to assemble the vehicle frames come from Rome, Ga.

Components from each of 226 suppliers follow their own logistical paths. A thousand of them, from 17 countries, arrive via [containers on ships](#) at port cities including Baltimore, Charleston, S.C., and Los Angeles, then move overland. Almost half of domestically supplied parts come from more than 250 miles away.

The logistics web was designed on the basis of just-in-time manufacturing, which aims to reduce waste and speed items through the factory, cutting costs.

In the factory's 100,000-square-foot supply area, giant rows of shelves stack two stories high, and a large board with color-coded lights—flashing or steady—shows the status of every station on the assembly lines. Employees move carts of components to stations as they're needed, with the parts prearranged to minimize time lost.

Engineers sweat the details to shave away inefficiencies. Many millions of dollars depend on keeping components, particularly valuable ones, in stock for the least amount of time possible before they're installed, while also avoiding disruptions in production.



Sources of factory parts used by Volvo Construction Equipment Corp. in Pennsylvania: **1. Sweden** - Volvo's axles, seals, and transmissions come by ship from Sweden. Ships stop at four ports of call before Baltimore, and delays can compound; **2. Mexico** - Electrical harnesses from Mexico used to travel on a route that goes through several major cities and were frequently held up. Volvo has switched all shipments to air freight, which is more expensive; **3. Georgia** - Custom-fabricated steel plates used to make Volvo's vehicle frames often get stuck in traffic on Interstate 81.

Illustration: Emma Erickson for Bloomberg Businessweek

For Middaugh, the production controller, the headaches don't end with I-81. In June a shipment of fenders arrived at the Port of Baltimore five days late because of congestion a freighter had faced along its East Coast route. A separate shipment of hood covers came in four days late, for the same reason.

The nation's 50 largest ports were handling 11% more cargo tonnage by 2019 than a decade earlier, according to the U.S. Department of Transportation. But investment in them hasn't been sufficient, experts say. Shipping channels need to be widened and deepened, berths for ships expanded, taller cranes installed for larger modern ships, cargo storage space added, and road and rail connections to ports improved to speed the transfer of freight, says Cary Davis, senior government relations director and general counsel for the [American Association of Port Authorities](#).

The bipartisan infrastructure package would "make up for a generation of deferred investment in our trade infrastructure," Davis says. "The U.S. hasn't done a good job of keeping up with the growth in freight, both import and export."

Volvo is resorting to bigger stockpiles—all the more so because of the added [supply chain glitches](#) caused by the pandemic, which have plagued the broader economy. At the Shippensburg facility, forklifts recently cleared an employee break area on the factory floor to add another "buffer zone," a place to temporarily store unfinished equipment when the production is disrupted because components aren't on hand in time.

It's the latest in a series of such moves. In late 2018, Volvo added three days to lead times for materials arriving in Baltimore because of growing congestion at East Coast ports. In 2019 it doubled its inventory of steel plates, to two days, because of the increase in highway delays.

Out on I-81, along with the other interstates that Volvo's supply chain relies on, setbacks can be exponential. Federal safety regulations limit truck drivers to 14 hours on duty, with 11 hours of driving, before a mandatory 10-hour rest period kicks in. That compounds the impact of unexpected traffic delays.

"On a weekly basis, I will get two or three emails where the driver is out of hours and has to hold for their rest period," says Mike Thomas, head of the logistics supply chain for Volvo Construction Equipment. Another headache for Middaugh.