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RAIL POLLUTION PROTECTION PITTSBURGH

The Impact of Climate Change on our Pennsylvania and National Rail Infrastructure

As far as railroad infrastructure, climate change's impacts are here and now in terms of more intense heat, cold, record rainfalls and flooding. This issue is what sustainable designers call a "Wicked Problem." For the rest of us, it is now clear that we have a national problem akin to a lit bomb-- but no one knows the length of the fuse.



"SUN KINKS" AND "SPAGHETTI RAILS"

How Much Heat is too Much Heat?

The Impact of More Intense Heat

As temperatures rise, the steel along the 140,000 miles of rail tracks throughout the U.S. will expand, get longer, and then buckle. The same type of extreme heat that causes the steel rails to expand also results in stress on the anchors, crossties, and ballast holding them in place.

https://www.parkerpioneer.net/news/article_180a3162-d53d-11ea-91cf-8328fb235fa4.html

This kind of buckling is called “Sun Kinks” or “Spaghetti Rails.” Cute names, but the result is a derailment. According to reports published in 2020, sun kinks have caused more than 2,100 derailments in the last 40 years in the United States. <https://interestingengineering.com/transportation/railroad-tracks-struggling-under-heat>

Before 1950, rails came in 39-foot sections, and there was room left where the track comes together to give the steel room to expand in extreme heat. These days, to save on maintenance costs, rail tracks come in quarter-mile strips and are welded together without the expansion joints. Heat could warp these train tracks, causing derailments: <https://www.live5news.com/story/12786857/heat-could-warp-train-tracks-causing-derailments/>

This problem is going to get much worse.

Ambient Air Temperatures

With ambient air temperatures over 90 degrees in the North and 95 degrees in the South, trains are “recommended” to slow down. The problem with slowing down is that it conflicts with Precision Scheduled Railroading — which is premised on strict on time arrivals. Moreover, given that UPS is Norfolk

Southern's biggest customer, we can anticipate that there is not going to be much slowing down at all. Norfolk Southern has made it plain to the Federal Rail Administration (FRA) in response to its latest Safety Audit that generally, it is not willing to comply with recommendations unless they're incorporated into FRA Regulations. [Norfolk Southern is a Bad Actor - All Railroads Must be Regulated](#)

In addition to ambient temperatures, rails that are in direct sunlight are approximately 30 degrees hotter than the surrounding air temperature. Finally, there is extra heat caused by both the friction generated by the speed and the weight of the train.

The Limits of Stretched Rails

To diminish buckling, steel rails are stretched to make them longer - but there is a limit and a fine balance. Ambient air temperatures over 110 degrees are outside the limit and the top range for welding expansion and stretching. <https://www.freightwaves.com/news/excessive-heat-can-impact-rails-as-well-as-driver-health>

European countries are painting their rails with reflective white paint to help prevent derailments from heat buckling – thereby reducing rail temperatures by 25-50 degrees. <https://www.ladbible.com/news/train-tracks-painted-white-20220717>. In addition, they are switching to using cement ties under their rails instead of wood, ballast, and soil, which mostly eliminates the buckling problem. However, none of these remedies are being implemented in the States since it interferes with rail operator's profits and are not mandated by the Federal Rail Administration (which is staffed by former rail and petrochemical executives and lobbyists.)

Finally, the New York Times featured an article on underground climate change resulting from increased heat under Chicago's buildings and rail infrastructure, causing the ground to shift in ways that would also increase the risk of

derailments. <https://www.nytimes.com/2023/07/11/climate/chicago-underground-heat.html?smid=nytcore-ios-share&referringSource=articleShare>

The Impact of Climate Change on the Steel Components of Rail Bridges

Everything described above applies to the steel components of rail bridges. Moreover, most of the rail bridges in Allegheny County and throughout Pennsylvania are an average of 110 years old. Almost all of our rail infrastructure was built using early 20th century temperature records. The complex mathematical computer formulas used to safely construct rail bridges now were not in use when most of our bridges were built - and the climate has changed besides. See Freightwaves article link above.

During the 2022 intense heat event in the United Kingdom, that country wrapped their older bridges in silver insulation before temporarily halting train traffic entirely. <https://newatlas.com/environment/bridge-insulation-foil-uk-heatwave/>. Again, because of the strength of the Rail and Petrochemical lobbies, none of that is going to happen here. Instead, the public must bear the risk.

“Zero Bridge Maintenance Business Model,” and the Vulnerability of our Rail Bridges

Understand that bridges are the most vulnerable point in any rail system. If you look, you will see for yourselves that rail bridges in Pennsylvania and throughout the nation, are not painted, and have missing bolts and cross ties that are so entirely corroded that they no longer touch. Unless these rail bridges were built recently, they are not COR-TEN weathering steel, but raw steel PURPOSELY left exposed to the elements.

The explanation for the poor condition of our rail bridges is the “Zero Bridge Maintenance Business Model.” In this model, the railroad’s own engineers will alert the state when the bridge is about 3-4 years away from complete failure,

declare an emergency, and get tax dollars to help replace it because of the extreme safety risk. In Pennsylvania that takes the form of a Rail Transportation Assistance Program (RTAP) grant. The best example is the Merchant Street Rail Bridge adjacent to the Clark Bar building on Pittsburgh's Northside. That bridge was neither raised nor lowered but replaced on an expedited basis - brand spanking new at a 70% discount. Thus, there is no incentive for railroads to maintain their rail bridges. (There will be more on the "Zero Bridge Maintenance Business Model," the Merchant Street Bridge, and the need to claw back taxpayer funding for an Impact Fund for those living in the derailment blast zone in upcoming RP3 emails.)

The purposeful failure of the rail operators to maintain their bridges, combined with the growing number of crude oil and other hazardous materials trains, has resulted in California authorizing its Public Utilities Commission to launch the first state-run review of privately owned rail bridges in the country.

<https://beniciaindependent.com/california-to-inspect-railroad-bridges-for-first-time-will-take-50-years-to-inspect-all-at-this-rate/>. This was necessary because the Federal Rail Administration is understaffed and underbudgeted. Between 2011 and 2015, FRA press releases disclosed that officials "observed 4,000 bridges" while conducting 800 "field audits". Bart Jansen in USA Today: "Feds urge railroads to share more info about safety of aging bridges". That means that, out of the 100,000 bridges in the US, federal safety officials inspected fewer than five percent of these rail bridges over a four-year period. [Corporate Greed and Regulatory Failure Have Again Put The Public At Risk](#)

How Much Cold is Too Cold

Remember the "fine line and balance" mentioned earlier. It depends on how much the rail was stretched - because a stretched rail will crack in extreme cold.

Record Rainfall and Flooding

Record rainfalls and flooding are occurring throughout Allegheny County and Pennsylvania. All along our rail lines there are antiquated water drainage systems that are being overwhelmed. When that happens, the soil under the ballast becomes supersaturated. The scientific term for this phenomenon is called “puddling.” Simply stated, what results is a shift in the soil under the ballast, taking the rails out of alignment.

Why This is a Big Deal

Magnitude of Risk

We need to take into consideration derailments and water pollution. Rail contamination of rivers happens more often than one may realize. In a recent report published by the Pittsburgh Collaboratory for Water Research, Education and Outreach, University of Pittsburgh researchers discovered that most train derailments in the region occur near major rivers. Data gathered from the Federal Railroad Administration between 2011 and 2022 showed that 211 of the 270 accidents occurred within 300 yards of a major river.

<https://www.govtech.com/em/safety/study-most-pa-train-derailments-happen-near-major-rivers>. The recent Harmar derailment came much closer to taking out all of Pittsburgh’s entire drinking water supply than we were told.

We all witnessed the impact of Norfolk Southern’s derailment in East Palestine, Ohio, which involved Vinyl Chloride. Norfolk Southern’s most significant East-West rail line through Pittsburgh and across Pennsylvania is the most intensively used corridor for transporting hazardous chemicals and explosive oil in North America. In terms of hazardous chemicals, consider that chlorine gas is regularly transported in rail cars through Pittsburgh. Each car contains 180,000 gallons of deadly chlorine gas under pressure. Any puncture will release the toxic heavier-than-air cloud suffocating all in its path in 10 minutes. You cannot evacuate Pittsburgh in 10 minutes.

Norfolk Southern’s line through Pittsburgh transports 40-50% of all of the most

explosive Bakken oil being processed by East Coast refineries. That is 2.1 billion gallons per year. According to the Wall Street Journal, each individual oil car contains the equivalent explosive force of 2 million sticks of dynamite. The unit trains carrying this oil are over 100 cars long.

Finally, Liquid Natural Gas (LNG) by rail was never allowed until permits were granted by the last administration. This is in our future given that 15 processing terminals are being built on the East and Gulf coasts—and whether that happens will depend on the next election. Understand that just twenty-two tank cars of LNG have the equivalent explosive force of the Hiroshima atom bomb.

Currently in the U.S. we are experiencing 3 derailments every day. Norfolk Southern derails one train every seven days. The current derailment rate in this country is unacceptable — and at the lower end of 3rd world countries.

We are NOT GOING TO BUILD OUR WAY OUT OF THIS. WE MUST DECARBONIZE because if you really think about it, **climate change is a weapon of mass destruction.**

The Cost of Climate Change on Pennsylvania Infrastructure

What We Know So Far

The Center for Climate Integrity, Resilient Analytics, and Scioto Analysis issued a report that calculates the costs of adapting to eight climate impacts for more than 2,000 municipalities in Pennsylvania. The report, [**Pennsylvania's Looming Climate Cost Crisis: The Rising Price to Protect Communities from Extreme Heat, Precipitation, and Sea-Level Rise**](#) is the first-ever attempt to determine the costs Pennsylvania municipalities will face to protect infrastructure and communities from climate change. Resilient Analytics has also made available an [**interactive visualization platform**](#) using the full set of climate scenarios from this study.

The excellent study finds that **municipal governments across Pennsylvania face more than \$15 billion in climate adaptation costs by 2040**, or nearly \$1 billion a year, to protect residents from hotter weather, heavier rain, and rising sea levels. This finding is based on a moderate climate scenario and does not account for the costs of recovering from any climate-driven disasters that will almost certainly occur, creating additional costs.

Note, however, that the study **covers only vehicular bridges**, finding:

- that Pennsylvania has some of the worst bridge conditions in the country, ranking second in the nation for the largest number of bridges designated to be in “poor” condition by the Federal Highway Administration. (Alison Premo Black, “2022 Bridge Report,” American Road & Transportation Builders Association, (2022), <https://artbabridgereport.org/reports/2022-ARTBA-Bridge-Report.pdf>;
- and that an increase in precipitation will lead to greater flow rates in Pennsylvania’s waterways. More vigorous flow rates will put more wear and tear on the bases and pillars of bridges. While there are multiple climate-related costs associated with bridge maintenance, this study quantifies the cost of proactively protecting the base of bridges to prevent wear and tear that could threaten the structural integrity of the bridge. Pennsylvania municipalities will have to pay \$268,511,000 by 2040 to maintain their bridges in the face of climate-fueled weather.

The same wear and tear from excessive heat and water flow applies to privately owned poorly rated rail bridges. As discussed above, in Pennsylvania 70% of the cost of private rail bridge replacement falls on taxpayers in the form of state RTAP grants — which drains available and critically necessary funding for municipalities. These taxpayer subsidies are being given to privately owned for profit multi-billion-dollar rail companies that are successfully continuing to lobby against rail safety policy reforms, while having donated \$454 million to our elected officials. <https://www.nytimes.com/2023/07/11/business/blocked-rail-crossings-congress.html?smid=nytcore-ios-share&source=articleShare>

In the last four months, Norfolk Southern spent \$1,657,500 on lobbyists who met with the same elected officials tasked with regulating the company. And in June and July alone, the company shelled out almost \$200,000 to a myriad of congressional campaigns and political action committees, or PACs, according to its recent filings with the Federal Election Commission. Sen. John Thune, the Senate's second-highest-ranking Republican who also sits on the Transportation Committee, is a former rail industry lobbyist himself who [has been opposed to the rail reforms](#). The rail safety bill was co-introduced by Ohio Sen. J.D. Vance, who helped lead the charge for an amendment that weakened the legislation, as The Lever [reported](#). See "Norfolk Southern is a Bad Actor" link above.

Again, none of the costs of a catastrophic derailment that impacts a city's water supply, damages public or private property, and is necessary to remediate impacted citizens in the blast zone are accounted for in the study. All of those costs are in addition to the \$15 billion in other climate-related costs that must be borne by our municipalities. One reason for this is that unlike the other six high volume rail corridor states, our Pennsylvania Legislature does not require rail operators to post a bond for damages that exceed the limit of their insurance policies - which Norfolk Southern acknowledges is inadequate to cover a catastrophic explosive derailment, in this excerpt from their 2022 Annual Report:

"As a common carrier by rail, we must offer to transport hazardous materials, regardless of risk. Transportation of certain hazardous materials could create catastrophic losses in terms of personal injury and property (including environmental) damage and compromise critical parts of our rail network. The costs of a catastrophic rail accident involving hazardous materials could exceed our insurance coverage. We have obtained insurance for potential losses for third-party liability and first-party property damages (see Note 17 to the Consolidated Financial Statements); however, insurance is available from a limited number of insurers and may not continue to be available or, if available, may not be obtainable on terms acceptable to us."

Calls To Action

Below are two Action Items:

1) Recently, Ohio Governor Mike DeWine [officially requested](#) that President Biden issue a Major Presidential Disaster Declaration for the East Palestine train derailment. That request must, however, be approved by the President. Notwithstanding Norfolk Southern's promise to "make things right," citizens in the fallout zone remain in dire need of every kind of assistance. Therefore, we ask that you contact President Biden and ask him to officially issue the emergency declaration. [Contact President Biden](#)

2) Next, write to Pennsylvania Senators Casey and Fetterman, co-sponsors of the Railway Safety Act, about what you want covered in this pending bill:

[Contact Senator Casey](#)

[Contact Senator Fetterman](#)

Suggested language:

Railroads have prioritized profit over safety for far too long, inflicting damages on the public in the form of horrific, wholly avoidable incidents which result in immense property damage and unacceptable illnesses and loss of life. The frequency with which this happens (three derailments a day) would embarrass a 3rd world nation. The current derailment rate will increase given the stresses that climate change induced heat, cold, and record rainfalls and flooding have on rails, rail bridges and antiquated water drainage systems along the tracks.

While the nation decarbonizes, Congress must reassert control and regulate train speed, track and wheel wear limits, special inspection oversight for rail infrastructure and rail bridge maintenance and inspections, mandate the use of cement rail ties and Electronically Controlled Pneumatic Brakes, shorter trains,

two man crews, acoustic wheel bearing detectors, 10-mile distances between detectors, lowered threshold temperature triggers, a revised definition of “Hazmat Trains,” and a requirement of adequate insurance or the posting of a bond by every rail operator to cover the full cost of damages in the event of a catastrophic derailment.

No legislation will matter unless the FRA is reformed and managed by professionals NOT beholden to the rail industry. The agency must also be funded commensurate with its responsibility to ensure safe operations. Until that happens, your assistance is needed to persuade the Pennsylvania Public Utility Commission to institute expanded inspection of rail bridge infrastructure.

In addition, federal diesel emissions reduction funding must be made available for the manufacture of cleaner Tier4 locomotives. Finally, we do not want higher center of gravity, less stable double stack trains running adjacent to unprotected DOT-111 tank cars through Pittsburgh or across Pennsylvania. Please take antiquated DOT-111 tank cars out of the rail system by 2025 as originally proposed and close the other loopholes in the Railway Safety Act. See <http://eepurl.com/inDIJQ>

Represent people, not polluters! The priorities of our elected representatives are called into question when, according to a New York Times analysis of federal lobbying disclosures, the railroads alone have spent \$454 million on federal lobbying over the past two decades. As a result, I ask you to pledge to ACCEPT NO MONEY from either the rail or the petrochemical lobbies — and ask your colleagues to do likewise."
