Charles Roebuck

Trains, Trump, Health, and the U.S. Infrastructure

President Trump wants to change the U.S. infrastructure and move toward a high-speed rail system. The need for change is now and China is willing to help, but will the U.S. government accept their help? People use public transit 35 million times each weekday, yet ridership is dropping in some places, including New York, Washington, D.C. and Los Angeles. Commuters are gravitating away from dated, unreliable systems. Forty percent of buses and 25% of rail transit are in marginal or poor condition, according to a government study. Experts argue President Trump should invest heavily in public transportation. "Building a new system of high speed rail in America will be faster, cheaper, and easier than building more freeways or adding to an already over-burdened aviation system - and everybody stands to benefit." President Obama, April 16, 2009

The environment has an impact on almost everything in our society. Especially, when it comes to the transportation industry in Europe and the United States. Trains emit carbon emissions into the environment, but the exact amount varies between the U.S and Europe. To understand the difference, we must first go back to the beginning before electrification. Steam trains were always a part of the railroad transportation systems in the U.S. and Europe.

"...what thrills me about trains is not their size or their equipment but the fact that they are moving, that they embody a connection between unseen places."
— Marianne Wiggins

Coal was used to power these type of trains, but this caused an issue for the environment. When coal combusts, carbon dioxide, nitrogen oxide, and sulfur dioxide is released. Thus, carbon emissions will result from this process and this is a big issue. Diesel and

electric trains are still used today, but in dissimilar roles. In America, we use diesel trains for freight and electric trains for passenger service. In Europe, electric trains are used for both due to the rail infrastructure. Diesel trains are more expensive to run than electric trains in the U.S. and Europe. Electric trains lower carbon emissions, noise, and run faster than diesel trains. In Britain, electric trains are 35% cheaper to operate than any other train.

"The railroad originally was as completely dissociated from steam propulsion as was the ship." John Moody

One of the issues, with diesel trains, is the weight that they place on the tracks. In return, this can raise the operating cost for railroads. This was part of the reason to shift to electrification in Europe and the United States. The infrastructure can suffer, if politicians receive complaints from environmentalists. This will cause the government to reduce the necessary funds to enable the railroads to operate trains. The Federal Railroad Administration in the United States, uses strict laws, to govern how trains operate in relation to the environment.

"I discovered, for the first time but not the last, that politicians don't care too much what things cost. It's not their money." — Donald J. Trump

Before, we go further into Trump and the U.S. infrastructure; we must examine one of two types of trains in the U.S. transportation system.

A NJ Transit General Electric Arrow III electric train

“Anyone who tells you that electricity is harmless is incompetent in the field of biologically harmful radiation exposures.”
— Steven Magee

Electricity is a phenomenon but when it was applied to trains it resulted in a transportation marvel. First, the railroad industry was required to comply with town ordinances concerning smoke inhalation from steam locomotives. After, this the modern era of electric trains was born in Europe and advanced in the United States. Werner von Siemens was the first to test the electric train concept in Germany. Electric trains can draw power in two ways through third rail or overhead wires called catenary. How does Electric trains work with electricity? Electricity can be supplied in diverse ways depending on the terrain in which the train operates. Electricity is a phenomenon but when it was applied to trains it resulted in a transportation marvel. First, the railroad industry was required to comply with town ordinances concerning smoke inhalation from steam locomotives. After, this the modern era of electric trains was born in Europe and advanced in the United States. Werner von Siemens was the first to test the electric train concept in Germany. Electric trains can draw power in two ways through third rail or overhead wires called catenary. How does Electric trains work with electricity? Electricity can be supplied in diverse ways depending on the terrain in which the train operates. The electrification system on railroads use alternating current(AC), or direct current (DC)depending on the actual setup of the railroad and its rolling stock. Direct current

has less loss of electricity compared to alternating current. Sometimes, interference from electromagnetic waves can occur when using alternating current. Three phase and single phase are methods for delivering alternating current from power grids (power facilities). Rolling stock is the train equipment used in passenger, or yard service. The electricity will be energized from a substation at certain points on the railroad called mile postings. The standard voltages for third rail and catenary wires are 750V and 1500V, respectively. Electric trains operate faster and quieter than diesel trains. Electrification systems vary on railroads along with its track geometry.

New Jersey Transit Rail Operations uses a catenary electrification system on the Hoboken and Newark Divisions. The trains use traction motors while operating, along with regenerative braking systems. The regenerative brake system allows the train to use heat from braking for kinetic power and store it as potential energy. This concept helps save energy by recycling power and keeps the train running more efficiently. The train has batteries located under the trains for this recharging method. In theory, the trains are moving electrical generators. Dynamic braking is used on the Arrow III MU electric trains. Metro-North Railroad uses the third rail method to provide electricity to its trains. The Kawasaki M-series uses a contact shoe to glide along the third rail to conduct electricity for the train. When you are dealing with high voltages you will get arcing. Sometimes, you will see a bluish light between the pantograph on catenary equipment, and between the third rail with the contact shoe. In Europe, the electricity may be bumped up to 1,000 V on a third rail. MTA's NYC Transit Subway system has a third rail system that operates between 625 to 650V. Direct current is used for third rail operation due to the skin effect. Substations convert alternating current that can be in the 20,000 V range to trains that use around 625V.The advantage to this system is its protection from outside elements during inclement weather. The catenary system can be impacted by inclement weather and in return power interruptions occur often. The wires can expand or contract depending on the ambient temperature. Amtrak experiences a lot of delays in rail passenger service along the Northeast Corridor. Phase gaps can happen when wires are connected to two different substations neutral sections (Phase gaps), if the operator of the train draws power, extreme damage can occur to the electric train. Signs with symbols or the word phase gap is posted within a reasonable distance to notify the operator to coast the train through this section of track.

The catenary system has many mechanical parts that help it work for electric trains. The parts consist of the contact wire, messenger wire, dropper wires, catenary wire, and pantograph from the electric train. The geographical area and budget of the specific railroad will determine which electrification system is used along with the type of electric train. This system is maintained by electricians and other transportation personnel. Amtrak, Septa, and NJ Transit all use the Northeast corridor for its electric trains. Substations play a pivotal role for the efficient operation of their electrical rolling stock.

The stations are approximately 8 miles apart to prevent loss of power between stations. Conversion facilities generate the initial power for the electrified system on the corridor. Large

voltages can be stepped up or stepped down to accommodate the electric trains. These various stations were first created by the Pennsylvania Railroad when they owned the Northeast Corridor between New York and Washington. This is the longest electrified system in the United States for electric trains. Electric trains like the Acela train can travel faster than the 80-mph regulation. Currently, the Acela electric train is the fastest train in the U.S.

I have experienced speeds of 100 mph on the corridor as a conductor for NJ Transit rail operations. Metro-North railroad operates on the portion of the corridor from NYC to New Haven, Connecticut. The Kawasaki M-8, can operate in two modes allowing it to use the catenary system on the Northeast Corridor. It can operate on third rail territory starting at Grand Central Terminal to Pelham station, but catenary wires run from Pelham to New Haven, CT. When his conversion of modes happens, the train goes from 750V to 12.5KV of power. This is the beauty of electric trains. Several companies make electric trains for railroads in the U.S. and Europe. Railroads in the U.S. use the following companies for its rolling stock.

The Kawasaki M-8 is an electric train that saves on operating costs and is an example of a modern electric train. It is designed to operate at a max speed of 100 mph. It uses AC traction motors manufactured by Mitsubishi Motors. The braking system uses pneumatic and regenerative braking systems to stop. A new model called the M-9 is an updated version in the M-series from Kawasaki. This train is made to order for Metro-North Railroad. The ALP-46, one of several NJ Transit electric locomotives uses the catenary system. It uses a pantograph to draw power from overhead wires. ALP-46 can generate 7,100 hp(horsepower) to obtain a top speed of 100 mph (miles per hour). All, electric trains run on track gauge measuring 4ft 8.5 inches. Siemens ACS-64 made for Amtrak is an electric locomotive with a maximum power range of 8,500 hp. The power is generated from the pantograph contacting the catenary lines on the Northeast Corridor. The braking system allows for less power consumption from the power grid, due to regenerative braking. The speed for this train is 125 mph with a consist (cars that make up a train) of five cars. A variant model known as the ALP-46A is an electro-diesel train with more power. General Electric built the Arrow III for use on the Morris and Essex lines. This train uses a pantograph to draw power to its traction motors. The train was engineered to operate at 100mph, but due to mechanical issues, it was reduced to 80 mph. Electric operation can be at 12k or 25k on the Hoboken and Newark divisions, respectively. A winding noise can be heard when the dynamic braking system is engaged. Electric trains use an apparatus called a pantograph which can be of single, or double designed, usually shaped like a Z. It requires different power levels to raise the pantograph for use with the catenary system. The system that raises and lowers the system uses compressed air supplied by the braking system.

This is what makes electric trains an engineering marvel because nothing is wasted, but recycled. Pantographs require constant maintenance to prevent damage to overhead wires. They should be visually inspected by the train's crew before departure, and after each trip.

Traction motors help convert the energy from the source of power to control the train's propulsion. Dynamic braking uses traction motors to help stop the train on certain type of

electric trains. The traction motors are used as generators, and this helps the air brake system stops the train. It is a more efficient way of preventing the braking system to overload. The dissipation of heat is what separates it from degenerative braking. An EMU, short for electric multiple unit can operate without a locomotive. This is the most popular units used on commuter railroads due to their quiet operation. They usually operate out of a push-pull consist meaning they can be controlled from either end.

The ICE 3 is considered a high-speed version of an EMU. The difference between electric train operation in Europe as opposed to the United States is the regulations on speed. Trains can travel at a higher speed outside the United States. Electric trains are engineered for my power to accommodate the need for speed. Technically, the United States only has one high-speed electric train called Acela. In Florida, a project is under construction called the "Bright Line". The service will match Acela service as an express train from Orlando to Miami, Florida. Siemens has been contracted to provide the rolling stock for this project. This project should be completed by 2019, and this will be operated by a private company.

The United States is restricted with electrification due to policies. Infrastructure is needed to expand electrification and politics prevent certain expansion of electrification in the U.S. Electric trains in the U.S. is used for passenger service, but not for freight service. Diesel trains are still used instead of electric trains due to the ability to charge for the actual service.

Europe has electric trains that are capable of electric-diesel operations. Bombardier Traxx is a new concept that can perform many functions. This train runs on an electrical train system called ETCS. European Train Control System. This system works for high-speed train travel and provides safety for trains operating on the rails. The system operates on four levels ranging from Level 1 to 4. This system will be used by all future railroad projects in Europe.

The Euro runner known as Hercules is an all in one electric-diesel train with three phase electrical supply. Electric trains can tilt to make travel easier around curves, and keep its speed. 3,000V of DC is normal in Europe, due to the higher governing speeds. One example of this type of train is the Kiha 283 series. In Asia, electric trains have pushed the limitations for transportation.

Japan has revolutionized the industry with its use of technology to allow trains to travel at speeds over 200 mph. Russia has a new train called "Lastochka" when translated it means swallow. Siemens designed it as a dual system to adapt to Russia's terrain and weather. The track gauge in Russia is 4 ft. 11 27/32 in. There was a time, when Russia was the USSR, it was behind schedule in electric train use. This is no longer an issue as shown with their existing transit system. Light rail trains use an electrical system known as conduit current collection. It is very expensive to operate and was used in various cities. New York City used this system because of restrictions concerning the use of overhead wires. This system is still used by Septa and New Jersey Transit. This service is being proposed by the MTA and the community in Williamsburg, Brooklyn to provide service for its residents in the future. Many cities use this type of transportation to divert train traffic in the transportation system. A light rail system

named “Trax”, uses 750 V DC along with overhead lines to power its propulsion. Some transportation insiders consider the light rail to be a safety concern. This may be due to its slow operation along the streets when crossing in front of traffic. The Link light rail is the most expensive in the United States. The light rail system can be expensive due to the intricate right-of ways that it rides along.

There are all types of electric trains in the world with distinctive characteristics. Depending on the country infrastructure electric trains can be made for the transportation system. The biggest hurdles are the government budget for transportation infrastructure to accommodate the needs of the people. As the population grow the transportation system will grow. The government regulations will ask the transportation industry to work around its costs. This will force the industry to come with modern technology that will replace the need for electric trains. This will raise two questions; What technology will be used for trains? Who will pay for it? The best trains will be the ones that travel from point A to B, and create results that we all can see.

"Under the current plan, electricity prices are going to rise by $3 billion a year and an average of 25 per cent per year." — *Adam White*

"Conventional electricity generation is the largest industrial source of air pollution in the United States, and wind power is a clean and renewable alternative. Whole Foods Market's commitment to wind power is providing an outstanding example of environmental leadership." — *Kurt Johnson*

Freight Trains, is the other half of the U.S. railroad transportation system. When you see train smoke, you never think about how it can cause respiratory illness. Diesel locomotives are in every major city in the United States. Now, the issue lies in the location of the diesel locomotives and the distance to your residence. One of the most difficult conundrums for train manufactures, railroads and the federal agencies that govern them is train smoke. In the United States, we use freight service to transport our goods across the country, but smoke travels with it. Most, locomotive engines are housed in rail yards in urban cities.

Locomotives are left idling in the rail yards for varied reasons. First, you have line-haul engines that are used for long distances that emit exhaust traveling long distances. Second, switchers are used in the rail yards to move trains. Switchers idle more than line haul engines by sixty percent and this is a problem. Locomotives must keep their temperature above forty degrees because they do not have anti-freeze in their engines, like automobiles. Keeping the engines idling will cause excessive emissions for the residents close to the rail yards. Federal standards are supposed to curtail these issues, but individual states must impose their own laws to prevent train smoke. Railroads are finding solutions to the smoke issue and this will help improve air quality. Once, the air quality is improved over time the environment and health issues will benefit.

Chicago has a huge emissions issue because multiple freight railroads exchange in the city. Chicago is the busiest freight gateway in the United States, and it's the only city where six out of seven railroads interchange freight with Canadian railroads. An idling demonstration was conducted between the EPA and the City of Chicago to reduce emissions. Start and Stop technology manufactured by the Kim Hot Start Company was used on several locomotives. The technology proved to be useful because it resulted in an annual NOx (Nitrogen Oxide) reduction of 80%. Chicago has the largest rail yard in the United States; the Belt Rail Yard. Chicago handles more than 37,500 rail freight cars each day and that number will double to around 67,000 freight cars per day. Imagine the emissions coming from this place and think of its impact on the residents of Chicago. This city has more NOx emissions and PM emissions from locomotives than all the cities in the U.S.

Belt Railway Yard, Chicago, IL

Is the government thinking about how many people will get sick, if they don't act fast? The numbers are there year after year, but the government would rather watch the trains smoke. It all makes since because they watch the people smoke, and just pay for commercials and advertisements. They might be receiving kickbacks from the freight industry and using our taxes to pay half of the bill for these incentive programs. Why would they do such a thing? It makes sense, if you look at the congestion of cities across the United States. More people equal more goods that need to be transported to them. This is all big business for the government and the railroad. The people's health is secondary to the fiscal impact that freight locomotives brings to the economy. Remember, the passage about Canadian railroads interchange with American Railroads in Chicago. This is evidence of the trade between two countries to improve their financial gain from the railroads transportation of goods. They move goods not passengers along those lines. The railroad workers are impacted worse than the people in the neighborhood.

Locomotive engineers and conductors work these trains from city to city, while inhaling the smoke. Here is a real shocker for you, I am one of the many workers that have inhaled this train smoke. As a former railroad employee, working on trains, and switching in the yards smelling train smoke is nothing new to me. I never recall seeing the EPA or anyone telling me how the train smoke could one day affect my health. Diesel trains exhaust has something called

Diesel Particulate Matter(DPM). The matter is made up of soot, sulfates, ash, metallic particles, and carbon. Exposure to these chemicals has short term and long-term effects on human life. Short term effects are eye irritation, dizziness, and nose irritation. Long term exposure will result in lung cancer and other respiratory disease. PM 2.5, is composed of particles less than 2.5 microns in diameter. These particles are hazardous because they can travel in the air for long distances. They can travel to the lungs and even remain in the bloodstream. Europe conducted extensive research and found a solution to this issue. They electrified most of their infrastructure for freight and rail. The European government is looking to save money, but the United States is making money off freight trains.

Why would America keep running freight trains with diesel trains, if it causes environmental issues? They are the best at it, but it is lucrative and the backbone of the United States railroad industry. Warren Buffett has invested in the American freight industry and this should show on the industry is a goldmine for the United States the U.S. has the commuter railroad or passenger system, and the freight system. The freight industry wants to stay old fashion to avoid being regulated by the federal government.

The Staggers Rail Act of 1980, allowed the freight system to regulate themselves. This is impacting the environment due to the diesel trains emissions. See, if the freight system is converted to an electrified system like Europe. The freight industry will not be able to profit as much, if they leave it the way it is. Maybe, the diesel exhaust is getting to these politicians. How can we pad the pockets of the rich, but fail to see the environmental impact of trains on the health of humans in the U.S. Why do I even ask this question? We have, a challenging time regulating cigarette smoke in the United States.

We are surrounded by carcinogens (a substance that causes cancer), but cancer in the United States is at an all-time high. The following experts have opposing views on high-speed trains and their impact on the environment. Dr. Anthony Perl, feels high-speed rail will have a positive impact on the environment because it does not use fossil fuels. This will be the most important part of its environmental impact. Transportation expert Richard Gilbert debates about how high-speed rail is still dependent upon grids powered by fossil fuels. He recommends creating a global grid-connected traction system.

Unless, more people ride high-speed trains instead of driving cars; it will barely have an impact on the carbon footprint. Now, we can see how three several types of trains can influence the environment. Europeans factor in the environmental impact as oppose to the United States budget impact on the environment. The United States is worried about the price to upgrade the infrastructure that will in return limit the greenhouse gas emissions. Europeans factor in the environmental impact as oppose to the United States budget impact on the environment. The United States is worried about the price to upgrade the infrastructure that will in return limit the greenhouse gas emissions.

The United States infrastructure is falling apart, while China, Japan, and Europe is perfecting their infrastructures.

President Trump proposes a $1 trillion-dollar budget to help fix the U.S. infrastructure. I wish President Trump would make Penn Station great again, and help Amtrak CEO Wick Moorman. Even, MTA LIRR is getting tired of this drivel because they share the station, and tracks with NJ TRANSIT along with Amtrak. On the contrary, Amtrak is being held back by President Trump's budget and congress. They already have major improvements in place to combat the failing infrastructure. The Northeast Corridor owned by Amtrak needs major improvements to keep the workforce booming in various U.S. cities.

A healthy Amtrak is an integral part of New York and
the Nation's economy and transportation systems.
- Tim Bishop

The Northeast Corridor is vital to the United States transportation infrastructure. Many trains travel from Washington, D.C. to Boston every day, which causes stress on the corridor. Over, 50 million people reside in the region known as the (NEC), or "The Northeast Corridor". The infrastructure must be improved before the ridership suffers, and then commuters will be forced off the trains. President Trump's budget will cut many infrastructure programs. The impact will cost us more money in the future.

Statistics, shows that more people ride the trains, than airplanes from Washington, D.C. to NYC. The Northeast Corridor is one of the great rail corridors of the world and it deserves an improvement. The United States on time performance still trails behind China, Japan, and Europe. The corridor supports freight which is the backbone of the United States railroad system. Mr. Warren Buffett and President Trump could benefit from the corridor. President Trump can buy some of the real estate surrounding the tracks. Mr. Buffett is an investor in the freight industry. I see him using his influence to convince congress and President Trump to fund the infrastructure. This is what Warren Buffett and the U.S. government thinks about investing in trains.

"Rule No.1: Never lose money. Rule No.2: Never forget rule No.1." Warren Buffett

We will break the corridor down my segments, so that we can see why improvement is needed. Amtrak, owns a 35-mile segment of track from Washington, D.C. to Baltimore. It consists of three tracks that stay congested, but a master plan in the works. The masterplan will improve the Baltimore and Potomac Tunnels. The reason behind the improvement is the ridership will exceed the capacity of the limits of the track. Meaning, the tracks can't

accommodate the flow of traffic. A major concern on the NEC is Union Station in Washington, D.C. This station is the second busiest in the Amtrak and Northeast Corridor system. Three railroads use this station Amtrak, Virginia Railway Express, and the Maryland Area Regional Commuter Railroad. Union Station needs to be expanded to accommodate passengers' needs and extra yard facilities for trains. By 2030, if improvements are not made we will face an infrastructure nightmare. A train station in the capital of the United States, should be the best station.

"Why did I choose Washington among offers from other cities? Because it is the capital of the world."-Vince Lombardi

A bridge called Gunpowder River Bridge, is one of three bridges, on the Northeast corridor. Since, the bridge was completed in 1913, its infrastructure has deteriorated. Freight trains run on the bridge at night, while Amtrak and MARC use it by day. Gunpowder River Bridge is not a moveable bridge. The Susquehanna River Bridge needs more repairs than Gunpowder River Bridge. This is the only moveable bridge on Amtrak's NEC, and causes the worst traffic on the Maryland segment of tracks. Beyond highways and roads, we need more money for mass transit, intercity passenger rail and freight rail.

The segment from Newark to New York is approximately 10 miles. The significance of this segment is the historic history behind it. This is where the most trains travel per day and the earliest railroad electrification transpired in the U.S. This segment is plagued with train traffic, but Amtrak has found a solution called the Gateway Program. This will allow new tracks to be built to help relieve congestion the Northeast Corridor. New York Penn Station is the making headlines, daily for more reasons. This station is owned by Amtrak, but two other railroads share the tracks. Amtrak has plans to improve the infrastructure of New York Penn Station. The budget cuts will prevent some of the plans, if President Trump fails to implement the right infrastructure budget. He must understand that this will increase his wealth after his presidency.

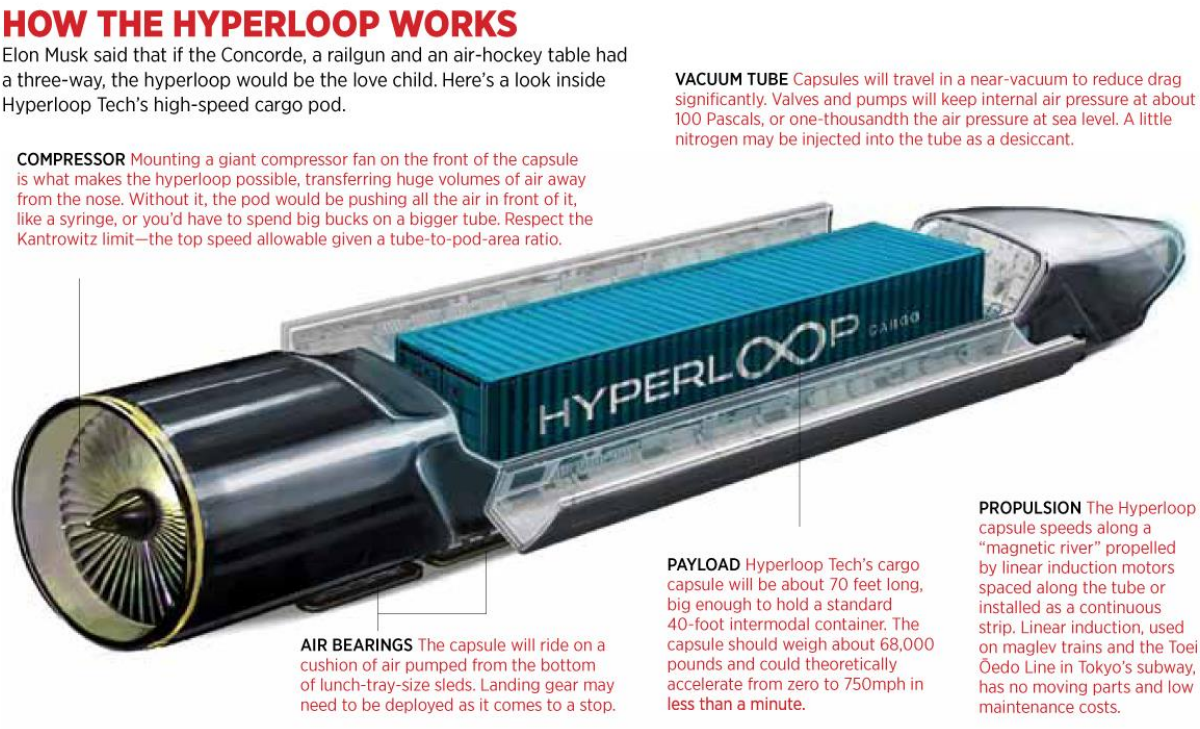
Better infrastructure will help his real estate holdings in New York City. Remember, your slogan "LETS MAKE AMERICA GREAT AGAIN"? You can start with reviewing Amtrak's plans for New York Penn Station. Here is a couple of solutions to this current issue. The Hudson Rail Tunnel could help improve the congestion in NYC. A new station called "Moynihan Station "across the street from Penn Station will help improve the passenger and train congestion. Phase 1, will expand the tracks that LIRR and NJ Transit use as track connections. The station will be in the old Farley Post Office and this is Phase 2 of the solution. The plans are already in place between the railroads, but the government must help fund them. Why, is the U.S. government worrying about the money that they will get back from the Northeast Corridor. The corridor will pay big dividends in the future.

"When America is united, America is totally unstoppable"-Donald Trump

Train congestion is a becoming a big problem on the Northeast Corridor and this has an impact on the economy, passengers, and Amtrak. If we build it; they will come. The infrastructure won't get better, unless the U.S. government strategically creates a plan and a solution. A clear solution to the U.S. red tape money issues will be to the engineers, EPA, and politicians at a roundtable to improve the infrastructure. The United States have the technology, but the mindset is another story. Politicians have been holding engineers and others in the scientific community for years. This has caused a drop in our position in the transportation industry. A good example of this can be seen with our signal systems and train accidents. Instead, of improving Amtrak President Trump's recent proposal will cause train service in Ohio to stop. In California, the high-speed rail system is having issues with the cost of building. Compared to Europe and China, the U.S. has a higher cost per kilometer around $ 56 million. The U.S. politicians are stuck in a paradox and they are causing more damage to the infrastructure than the trains.

"Nothing was more up-to-date when it was built, or is more obsolete today, than the railroad station." -Ada Louise Huxtable

China has reached out to the United States privately, especially in California. Now, you can see the U.S. government is just blowing smoke, and trying to save money. They want the projects funded by private investors, instead of with our tax paying dollars. Trump, can propose, but his party is holding our trains back. This is causing health issues in our cities.



If we could do high-speed rail in California just half a notch above what they've done on the Shanghai line in China, and if we had a straight path from L.A. to San Francisco, as well as the milk

run, at least that would-be progress. Elon Musk

In the meantime, I think this the best solution for the United States. Hyperloop appears to be a challenger to the existing high-speed rail system, but it's unlikely that it would fill the same transport niche. Hyperloop is a low-pressure steel tube containing passenger or vehicle capsules that can move along a cushion of air, and are sped up by magnetic linear accelerators located at stations along the tube with rotors located in every capsule. Climate Change, nanotechnology, and swarm robotics are a big part of the future of trains. Climate change can change operating conditions and cause extensive damage to trains and the infrastructure. A track cover should come out the ground when flooding or huge storms hit. This can help prevent the tracks from getting damaged. An even better solution to this weather issue is, swarm robotics. Swarm robotics is a theory that is like how ants and bees work in a colony. It is a cheap way to have groups of robots help with track inspection, maintenance, and repair. They can sense weather and repair the infrastructure without the cost of human labor. Airships are being named the new form of transportation replacing, trucks, trains, and ships. They could carry freight loads that trains have a tough time carrying, and hyperloop is the future of transportation.

Hyperloop, is Elon's Musk's, way of train travel in the future. By 2050, the world's population will increase the need for more reliable trains. Also, the fossil fuel consumption could become an issue, but a solution can be Hydra Rail, or trains powered by hydrogen. Nuclear, solar, wind, and hydro-electric can replace the use of fossil fuels to power the locomotive trains of the future. Alternate fuels will cut the transportation budget in half and this could help fund new infrastructure projects. Hydra rail, can replace the death on rails, or Diesel-electric trains that pollute our U.S. cities with carbon emissions. Hydrogen fuel cells could replace the diesel to power the engines of locomotives. The freight and passenger rail system will be the lifeline of the United States, by 2050. The United States government is the issue; when it comes to the infrastructure and the future of trains. How do we solve this issue?

The railroad must find a way to support itself and stop depending on government subsidies. This will allow them more freedom and they will receive more feedback from the government. Especially, under President Trump's administration because Republicans love self-sufficiency. Unless, China let the United States borrow money for the railroads. They help build them in the early days, but we refuse to take their advice to rebuild them. China, is leading the pack on trains and infrastructure. While, the train traffic is becoming an issue in the U.S., China is investing without prejudice.

America has a need for speed with cars, trucks, ships, and trains. Why are we the cheapest spenders on trains and infrastructure? The answer is simple: American greed and we think greed is good, but it's hurting our infrastructure. In return, we are losing the passengers and revenue stream from a once booming transportation system. Hydra rail, is the solution for the U.S. freight system. The water and nuclear power of the train can power trains through non-electrified territory. This will eliminate the particulate air particles from carbon emission

associated with diesel trains. The whole point of a transportation budget is to spend, but within means and find ways for future train projects.

I had a phone interview with Amtrak's CEO Wick Moorman. He stated, "A series of initiatives are being planned to strengthen railroad infrastructure and improve operations and preparedness at New York Penn Station."

Amtrak 's Future Trains

While, the U.S. is struggling to iron out politics, train accidents are happening on some of its commuter railroads. A system like ATP or ETCS can prevent further train accidents. The National Transportation Safety Board(NTSB) is called out to investigate train accidents in the U.S. They have conducted a study, leading to an outcome favoring positive train control for all commuter trains in the U.S. Several recent train accidents involving Amtrak, Metro-North, NJ Transit, and Long Island Railroads. President Trump, can help make America great again, by helping improve the railroads through a new executive order. We will see over the next couple of months his plans for the railroad industry. This is a solution to the health issues and rail issues in the United States.

A transportation specialist at the Congressional Research Service by the name of William J. Mallet stated this in an interview, "I'm not convinced high -speed rail is the answer to some people's prayers, because the geography of the United States is different than Europe. A high-speed rail network that covers the whole country is probably not feasible." This is due to the low car ownership of European countries as opposed to the United States. Rising fuel costs alerted Europe to find an alternate way to travel. China, which has the largest transportation

infrastructure system, in the world is leading the way in high-speed rail. Amtrak was supposed to be America's entry into high-speed rail, but the top speed is only 125mph.

Amtrak is far behind in high-speed rail travel among European trains. The U.S. government has a special interest in Amtrak. The U.S. government funds other commuter railroads, but Amtrak is special. It covers more commuter rail than any other U.S. commuter railroad. Before, Amtrak came into existence many railroads existed, but over time they became unprofitable. The passenger rail system would have been non-existence, if the U.S. government would have not stepped in to save it. Where is the government now? When will they provide more money to improve the infrastructure? The Republicans want to allow private investment to provide the funding for the commuter railroads.

"Americans are broad-minded people. They'll accept the fact that a person can be an alcoholic, a dope fiend, a wife beater, and even a newspaperman, but if a man doesn't drive, there is something wrong with him." ~Art Buchwald, "How Un-American Can You Get?" *Have I Ever Lied to You?* 1966

In conclusion, trains are the veins that help pump life into U.S. cities, and they have a self-driving future. Yes, it sounds funny, but it has some advantages for passenger, and freight rail systems. Safety is paramount for all forms of transportation. The infrastructure can benefit from self-driving trains, I know you are thinking in what ways.

Self-driving trains eliminate damage to the current infrastructure. It reduces budget costs because they don't need train personnel to operate them. Human error can cause unnecessary damage to trains and tracks. These trains may displace some train operators and conductors, but will save humans health and the infrastructure. I am sure President Donald Trump and members of the Congress will agree.

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Bibliography

“The best way to predict the future is to invent it.” —Alan K

Browne, Stefanie, Richard Clinnick, RAIL Magazine, and Paul Stephen. "Systra sponsors National Rail Conference 2017." *Rail*. N.p., 10 Apr. 2017. Web. 11 Apr. 2017. <http://www.railmagazine.com/>.

Americans are broad-minded people. They'll accept the fact that a person can be an alcoholic, a dope fiend, a wife beater, and even a newspaperman, but if a man doesn't drive, there is something wrong with him.” ~Art Buchwald, "How Un-American Can You Get?" *Have I Ever Lied to You?* 1966

The only way of catching a train I have ever discovered is to miss the train before-G.K. Chesterton

Coxey, William J, Frank C Kozempel, and James E Kranefeld. *The Trains to America's Playground*. 1st ed. [Oaklyn, N.J.]: West Jersey Chapter of the National Railway Historical Society, 1988. Print.

"European Railway Review." *European Railway Review*. N.p., n.d. Web. 11 Apr. 2017. <https://www.europeanrailwayreview.com/>.

Hay, William Walter. *Railroad engineering*. New York: Wiley, 1982. Print.

Henck, John B. *Field-book for railroad engineers. Circular and parabolic curves, turnouts, vertical curves, levelling, computing earth-work, transition curves on new lines and applied to existing lines, together with tables of radii, ordinates, long chords, logarithms, logarithmic and natural sines, tangents, etc., and a metric curve table*. New York: D. Appleton and Company, 1912. Print.

"The aim of Karate lies not in victory nor defeat, but in the perfection of the character of its participants." ***– Gichin Funakoshi***

"Empty your mind, be formless, shapeless - like water. Now you put water into a cup, it becomes the cup, you put water into a bottle, it becomes the bottle, you put it in a teapot, it becomes the teapot. Now water can flow or it can crash. Be water, my friend." — *Bruce Lee*

"Mistakes are always forgivable, if one has the courage to admit them." — **Bruce Lee**

If you spend too much time thinking about a thing, you'll never get it done- Bruce Lee

"Use only that which works, and take it from any place you can find it."
—LEE, Bruce, Tao of Jeet Kune Do

"Some martial arts are very popular, real crowd pleasers, because they look good, have smooth techniques. but beware. They are like a wine that has been watered. A diluted wine is not a real wine, not a good wine, hardly the genuine article. Some martial arts don't look so good, but you know that they have a kick, a tang, a genuine taste. They are like olives. The taste may be strong and bittersweet. The flavor lasts. You cultivate a taste for them. NO one ever developed a taste for diluted wine" — Bruce Lee, Tao of Jeet Kune Do

MacDonald, Larry. *The Bombardier Story*. 1st ed. Toronto: J. Wiley, 2001. Print.

“All things are subject to interpretation whichever interpretation prevails at a given time is a function of power and not truth.”- Nietzsche, Friedrich

"100 Years Ago, in Railway Age Gazette: A Consolidation of the Railroad Gazette and the Railway Age." *Railway Age* 1 July 2016: n. pag. Print.

"Rail Transit-Train Transportation | Masstransitmag.Com | Mass Transit". *Mass Transit*. N.p., 2017. Web. 6 Feb. 2017.

Roberge, Pierre R (2008). *Corrosion Engineering*. 1st ed. McGraw-Hill Publishing, Print.

Better three hours too soon than a minute too late. -William Shakespeare

Solomon, B., & Yough, P. (2009). *Coal trains: the history of railroading and coal in the United States*. Minneapolis: MBI Pub. Company

"Transportation Environmental Resource Center." *Transportation Environmental Resource Center*. N.p., n.d. Web. 07 Mar. 2017.

"Tracking news and events in the railroad industry." *Tracking news and events in the railroad industry RSS*. N.p., n.d. Web. 11 Apr. 2017. <http://www.railroad.net/>.

"Who can be patient in extremes**?" -** Shakespeare, William

What’s the railroad to me? - Thoreau, David Henry

Suppose you were an idiot, and suppose you were a member of Congress; but I repeat myself- Twain, Mark

"Knowledge is the beginning of practice; doing is the completion of knowing." Wang Yongming