

# Subway Station Safety of New York City

Khang Phan  
Abdulkadir Sattar  
Kenneth Wong  
Jinfeng Ouyang

City College of New York

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Prof. Julia R Brown

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# Summary

One of the greatest conveniences in New York City is the subway system. The New York City subway system is used by approximately 142 million people a month before COVID-19 to get to various destinations within the city. After the COVID-19 pandemic, we noticed a surge in criminal activity in our train stations by up to 42%. In addition, there are already 25 incidents of subway shoving in 2022. We see more people worried and afraid of the trains, thus riding it less. Our team of hardware and electrical engineers propose more security measures in our trains to combat crime, mainly creating platform barriers to stop people from being pushed onto train tracks. To achieve our goal, we set up an NYC Subway System Foundation to accept donations from the society as a budget. Our team has searched for multiple resources to support our proposal and improve its feasibility. Hopefully, by the end, we could make commuting around New York City safer and approachable to every civilian.

# Introduction

The subway system is one of the most convenient means of transportation in New York City. However, it also has the potential for horrendous disaster if proper safety measures are not in place. The momentum of trains entering the station can kill any living being within seconds. Thus, trains potentially serve as a public tool for suicides or murders. According to the article, "MTA Data Shows How Many Times People Killed by Train" the author Melissa Klein reports an increase in train suicides. Klein states, "Suicides rose 60 percent in the first eight months of 2021 to 16,

compared with ten during the same time the previous year. Eight people fell from between cars from January through August 2021, up from six in the same period in 2020, although the data does not show how many of them may have died" (Klein, 2022). With a rise in suicides and accidents, it is evident that safety precautions are needed to prevent people from jumping onto the train tracks and accidents such as being shoved off. For instance, the article "Watch your back: Despite big decrease in riders during COVID pandemic, NYC seeing terrifying string of straphangers shoved onto subway tracks" demonstrates more subway shovings during COVID. The author explains, "in 2020 — when the pandemic pushed millions of riders away from the subway — cops reported 26 subway shoves, a 30% increase from 2019" (Kregstein, 2021). These statistics depict a trend of using the trains as medium for suicide and crime.

In this proposal, our team will strive to enhance safety and comfort in the subway system as well as in train stations. Our plan is to carefully install platform screen doors in subway stops all throughout New York City. When a train arrives, the doors will slide open allowing people to safely board the train. With this proposal we intend to prevent anymore New Yorkers from falling victim to train deaths and save lives.

## **Project Description:**

This proposal aims to enhance the safety and comfort of the subway stations of New York City. This proposal will offer one solution to approach the goal. People fall onto the subway tracks more often than people would think. "There were 1,267 reported

track intrusions last year, according to the MTA — up from 1,094 in 2020 and 1,062 in 2019" (Martinez & Pedraza, 2022). A solution to stop people from falling carelessly or jumping deliberately onto the track is to set up a wall on the edge of the platform, also called a platform screen door. Platform screen doors are a relatively new occurrence and can be found in many examples, one of which is a platform barrier at the AirTrain station at JFK airport.

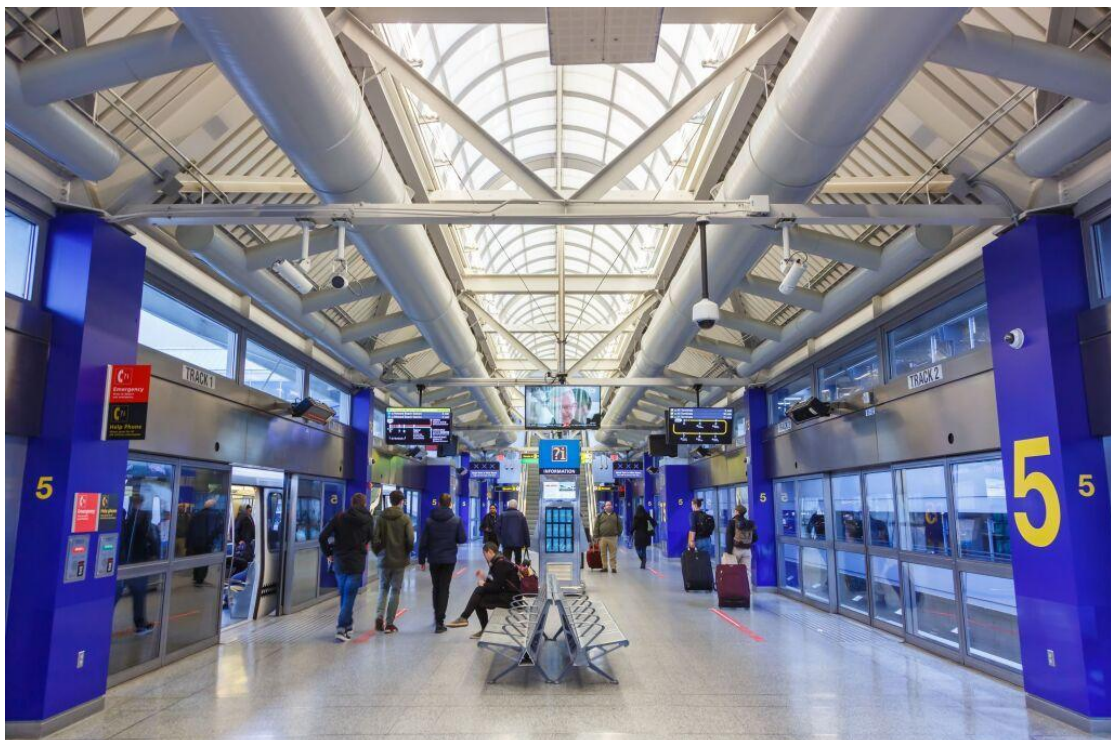


Figure 2 Platform screen doors at the AirTrain station in JFK airport, February 29, 2020. Markus Mainka/Shutterstock

The platform screen door has been implemented in countries such as China, Thailand, and South Korea "China has them, Thailand has them, South Korea has them,' a former senior MTA official who did not want his name published told THE CITY-'Systems all over the world have made the decision to go in that direction, so now it's just a matter of when are we going to wake up on this?' "(Martinez, 2022). The subway in New York City is the only infrastructure system that does not include these platform barriers.

The platform barriers are composed of polycarbonate panels that function as automatic sliding doors. The barriers will be half the height of the subway doors. Whenever the doors of the subway opens, the doors to the platform barriers will open and allow passengers to enter or leave the subway car. The barriers are a combination of both mechanical engineering and software engineering. The barriers are installed on the floor of the subway station and are mechanically rigged to open and contain software that instructs the door to open when the doors of the subway are opening.

Forth, found an NYC Subway System Foundation to receive public donations as a budget to help the MTA enforce the listed solutions only. Even though MTA seems to be the most profitable company in NYC, according to "The MTA's seven bridges -- including the Triborough Bridge -- and two tunnels transport about 300 million vehicles each year. In turn, they generate over \$1.6 billion in annual revenues, with a staff of only 1,545" (Ghoshal et al.). However, as a matter of fact, the deficit between the revenues Great Recession. From then on, the two have drifted further apart" (Ghoshal et al.).

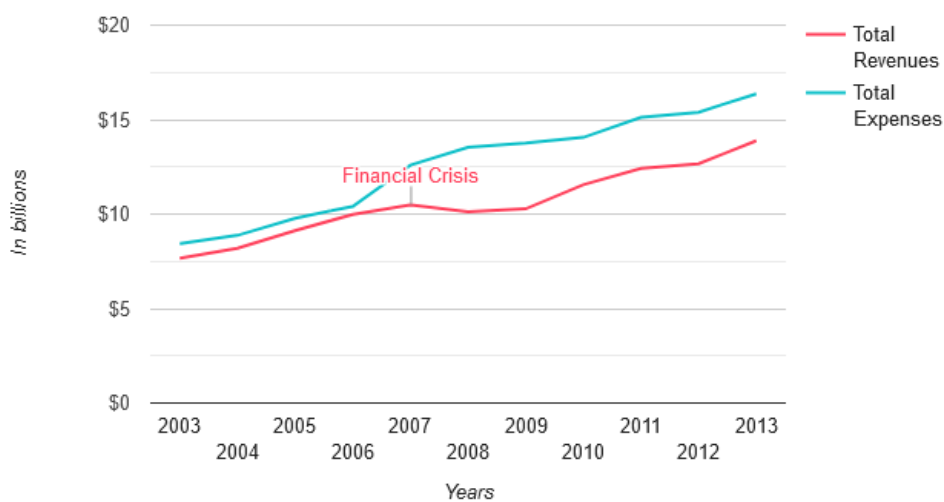


Figure 3 The Growing Deficit from 2003 to 2013. Source: MTA  
 Setting up a foundation to raise the budget through public donations will make the proposal more feasible.

# Budget

Talking about the Times Square proposal from earlier, we have calculated an estimated budget for this one station and is applicable for multiple platforms. This specifically is a budget for the Times Square 7 tracks. First of all, the overall budget of the MTA from 2022 is approximately \$18.5 billion according to the Metropolitan Transportation Authority's Executive Budget. To narrow in on the costs of the train barriers, we first need to calculate the dimensions of the subway station. Most of them are "...ranging from 480 to 600 feet (150 to 180 m) long, though some IND platforms may be as long as 660 to 745 feet (201 to 227 m) long." (Feinman, Mark) For the sake of simplicity, we will use Times Square. For how big it is, one would need \$227,292 worth of polycarbonate to be the barrier on both sides of the station after calculating the size of Times Square-42nd Station. Then there is the cost for the automatic sliding doors for every entrance of a train so if we're considering the mechanisms alone, that would be about \$26565 for every mechanism. These are only the costs for the primary components. There are still other costs for things like reinforcements such as steel which is about \$0.03-\$0.05 per pound.

Now it would be the labor costs which include people such as the mechanical and software engineers to experiment with the design. Their average labor costs came to be about \$72,200 annually. This would be completely dependent with how long we would experiment. For example, it would be \$216,600 if the process was about 3 years, but this is just for one of the positions. Then we need electricians and mechanics to actually install them into the station along with other construction laborers. These would add up to about \$54,000 and \$49,200 respectively. Similarly, this accounted for a hypothetical year's worth of work.

# Conclusion

Platform screen doors should be installed to prevent people from falling or jumping into the tracks. Platform screen doors are the only solutions to people that are pushed into the tracks or jump into the tracks. Most stations have little to prevent passengers from falling onto the tracks. What prevents people from falling onto the tracks is their awareness of their surroundings.

However, it is also a large obstacle. The only barrier to this proposal would be the large cost of installing these platform screen doors . It costs a prodigious bill for all stations to install the platform screen doors, claiming “that potential billion-dollar costs and engineering challenges” (Martinez, 2022) would make the implementation and installation of platform screen doors unrealistic and unmanageable.

Although, these proposals should at least be partially implemented for experimentation instead of being installed all at the same time in every station, if the logistics and costs are believed to be beyond the capabilities of the MTA. These costs for these proposals will only increase with time and as the subway system becomes more obsolete and older. It is best to spend the costs that will seem miniscule now and implement these proposals in order to improve the safety of the stations. It is important that these proposals be implemented and maintained sufficiently.

An example that can be used as a model is the implementation of improvements in Shenzhen City.



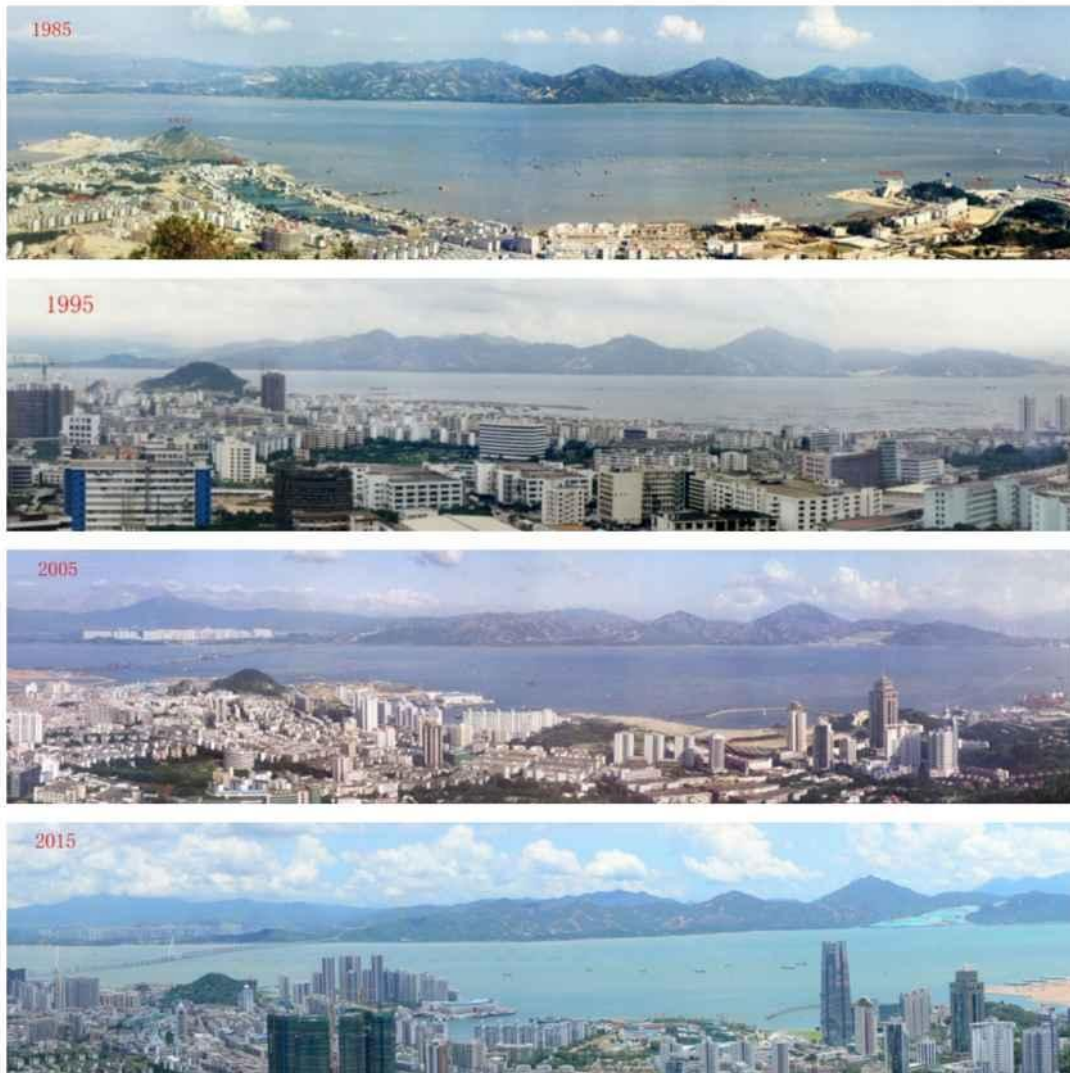


Figure 4 The Change in Shenzhen City, China over 40 years

China is building screen doors for each of its stations. "The 1.5 m-tall metal and glass doors are the first barriers for China's oldest subway line, which started operations in 1971. Builders reinforced the platform before installing the doors. By the end of 2017, the remaining 22 stations on the line will all have screen doors" (Xinhua, 2016).

The MTA and all New Yorkers have reasons to push the implementation of platform screen doors in an attempt to make the subway safer, especially with a larger surge of crime in recent years. "After years of saying engineering obstacles and enormous costs made the doors a non-starter in the subway system, the MTA

backtracked in February, following Go's death at Times Square-42nd Street in January" (Martinez & Pedraza, 2022). Go was a victim who was pushed and then fell onto the tracks. Setting up the screen doors will prevent future incidents such as this from occurring. Incidents such as Go's death demonstrate a clear need for implementing these four proposals, especially platform screen doors.

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