Automatic MTA Trains

Group #1: Chrystal Mingo, Jennifer Singson, Roberto Morales

Chrystal Mingo- Computer Science
Jennifer Singson- Civil Engineering
Roberto Morales- Civil Engineering

IDENTIFY WHAT WORK IS TO BE DONE:

- How does the Communications Based Train Control (CBTC) work?
    - How is CBTC different compared to a regular train?
    - How is it installed?
    - Are the rides smoother or better than a regular train?
    - Is it likely to cause delays or malfunctions?
- What is the CBTC capacity?
    - How many passengers can it hold?
    - How many seats does it have?
- How long will the installation of the system take?
    - Will there be additional components
    - How long will it take to manufacture
    - Projected completion date
- How much will it cost to install?
    - Cost of production and equipment
- How often is the maintenance?
    - Is the maintenance for the whole train or is the maintenance split into parts?
    - How much will the maintenance cost?
- Who is responsible for programming the trains and functionality?
    - Is there a team that needs to be trained to program and run the trains
    - Who's going to be needed for the project
    - How long will training take

EXPLAIN WHY THIS WORK NEEDS TO BE DONE:

New York City is one of the top most populated cities in the world thus, the city needs an efficient mass transportation system. As population increases, more people rely on the public transportation system to commute, opposed to regular vehicles. More modern residential buildings are continuously being built that can support numerous people, however there aren't any new roads to compensate for the increase in population. The increase in population leads to an increase in people who commute with the use of trains. This will not only cause immense

amount of delays, but it will also fracture the train system. The Communications Base Train Control will help solve this dilemma. The CBTC is cost-effective due to the fact that the system does not need as many physical signals compared to the fixed block system. Therefore money is saved in terms of maintenance. Not only that, the CBTC also decreases delays as well as increases the job opportunities in society.

STATS:
New York's subway now has the worst on-time performance of any major rapid transit system in the world, according to data collected from the 20 biggest. Just 65 percent of weekday trains reach their destinations on time, the lowest rate since the transit crisis of the 1970s.

By means of the CBTC systems, the exact position of a train is known more accurately than with the traditional signaling systems. This results in a more efficient and safe way to manage the railway traffic. Metros (and other railway systems) are able to improve headways while maintaining or even improving safety.

QUALIFICATIONS//TECHNICAL APPROACH//MANAGEMENT PLAN

This group of engineers is composed of two civil engineers, one computer science expert, and a mechanical engineer who are more than capable to withstand a project of this size. In a full study of the operations within the Metropolitan Transportation Authority's subway system and how to further reduce issues caused by the current fixed block signaling system and to further enhance subway service, to decrease headways in between trains. The civil engineers will survey the remaining 657 miles of track to determine appropriate spacing for cbtc receivers. The computer science expert will handle the programming of the system once all components have been installed. The mechanical engineer will be in charge of installation of the cbtc equipment and retrofitting rolling stock to be cbtc compliant, reducing costs in the need for newer rail cars.

The first phases of the upgrades are already in revenue operation on the BMT Canarsie Line (L) train. Within the next several months the CBTC system on the IRT Flushing Line (7) will go online. Hot spot areas to focus implementation will be the IRT Lexington Avenue Line 4,5,6 trains as well as the IND Queens Blvd line E,F,M,R trains. This is due to the heavy riderships on these lines and should have priority to further expand capacity of trains per hour with CBTC operations. For works to begin we will be working with the MTA to implement planned closures of lines, in order to have a safe working environment for track crews and engineers to install the necessary equipment without risk of running into moving trains. The first phase of implementing CBTC systems to the Lexington Avenue and Queens Blvd Lines is expected to take a period of 2-4 years for installation within a tight window of weekend closures.

Once equipment is installed, workers at the command center of MTA will be trained on the new operations of CBTC within installed sections and how to program the system. In addition training will take place for motormen and conductors operating trains as many will

undergo refurbishment for CBTC receiver equipment. Once training is complete, trial runs will take place during late-night hours as headways between 12:00am - 5:00am is 20 minutes per train. A grace period of 6 months will be placed to ensure the CBTC system is operating as normal as possible.

Money goes into-

- Research and development
- Software
- Construction/Installation
- Materials/Equipment
- Prototyping
- Payroll for staff
- Fees regarding license, permits, and registration

For More Info:

http://www.railsystem.net/communications-based-train-control-cbtc/

https://www.nytimes.com/2017/11/18/nyregion/new-york-subway-system-failure-delays.html