RRD21LR015
San Francisco Bay Area Rapid Transit District
Passenger Fatality
September 16, 2021
San Francisco,
California

National Transportation Safety Board

Operations Factual Report

Accident

NTSB Accident Number:	RRD21FR015
Date of Accident:	September 13, 2021
Time of Accident:	3:13 p.m. (PST)
Type of Trains and No:	BART Blue Line #T511
Crew Members:	Train Operator
Location of Accident:	Powell St. Station, San Francisco

Working Group

Ryan Frigo
Operations Investigator
National Transportation Safety Board

Michael Hoepf
Human Performance Investigator
National Transportation Safety Board

Bernardo Bustamante
Regional Engineer
Federal Transit Administration

Roy Aguilera
Operations
San Francisco Bay Area Rapid Transit District

Robb Bury
Safety
San Francisco Bay Area Rapid Transit District

Michael Borer
Supervising Investigator
California Public Utilities Commission

Jessie Hunt
President
Amalgamated Transit Union – Local

Summary

On September 13, 2021, at about 15:13 pm local time, a passenger and dog had boarded a Bay Area Rapid Transit (BART) train. After receiving a report of an incident between the train and a passenger at the Powell St. Station. The northbound blue line train was diverted to the yellow line and proceeded to the Concord mechanical facility for storage and inspection by investigators. Preliminary information indicates the dog was on a leash that was attached to the passenger's backpack. Seconds before the train's departure the passenger stepped out of the train from car #9 out of a 10 car consist and onto the platform while the dog was still on the train. The doors closed separating the passenger from the dog and had pinched the leash in the doors. The train departed dragging the passenger along the platform. The distance from the operator's window to the rear door of car #9 where the subject passenger had exited was 611 feet. There were no visual indications on the dog that suggest it was a service animal. The dog was not injured and was returned to the passenger's boyfriend who was identified by police as a transient with no physical address.

Figure 1: Image of rear of accident train located on track 16 in the Concord maintenance yard.

Figure 2: Investigator performing door cycling operations on accident train

Equipment

The train was a legacy train, that is BART has recently ordered a new fleet of cars, this was one of the older generation. There are 2 passenger doors per car. The Operator was in a C car operating unit. It was a 10-car train. The lead door of the 9th car was the one where the accident occurred.

Train Control

Trains are controlled by Automatic Train Operations (ATO). The Operator was in ATO mode at the time of the accident. In this mode, the train berths automatically, the doors open automatically upon proper berthing (which depends on the train length). After the door dwell based on the present schedule (usually 10-15 seconds) the Operator receives a door release indication which consist of a flashing light and an audible signal. The Operator presses a button to manually close the doors after observing that it is safe to do so.

Regarding door functionality – the doors have sensors which detect ¾ inch objects in between doors. If something is detected, the doors temporarily lose power, and then 3 seconds later will attempt to close again. Process will repeat until doors close successfully. Upon closing the doors become locked and can only be opened the Operator from the lead cab, or through a key switch at each set of door panels, or the emergency door release (which applies to a single door panel). The train cannot depart if the train detects that the doors are open (3/4 inch or more).

Method of Operation
The BART System was operating with 15-minute headways at the time of the accident.

Interviews Conducted

- Train Operator
- Powell St. Station Agent

*Interview transcripts can be found in the docket for this accident.

Post-Accident Actions

- Transportation
    - Reevaluate existing “lookback” procedure and training curriculum
        - BART is installing LED lights at the end of the platform in the four downtown San Francisco stations, for an operator, clear sight lines of the lights would indicate no obstructions at the platform train interface.
    - Consider any changes to train operator manual (TOM) related to “lookback”

    - Evaluation of platform lighting in downtown San Francisco stations

- ADA
    - Develop awareness campaign on traveling with service animals and/or pets
- Safety
    - Reevaluate existing PPE program for TOs

On-site Observations of the Group (9/15/21)

- The Group conducted on site observations at Lake Merritt and Powell St. Stations. Both stations are in an underground environment.
- Lake Merritt Station
    - The Group determined there was ambient lighting in the Lake Merritt Station. The lighting present is the older standard which is fluorescent lamp lighting.
    - Station platform was clear of debris, passenger count was approximately 25 people at 4:00 p.m. There were unobstructed sight lines of the yellow tactile on both platform edges.
    - The group observed that the walking conditions were regular and even and free of obstructions.

- Train ride to Powell St. Station
    - The operator made announcements before station stops informing passengers of the next station, and what side that the doors would be opening on. While servicing station platforms, the operator made informational announcements to passengers. Door chimes were present immediately before and during the door closing process. Additionally, red blinking lights alternated as the door cycle activated and completed.
    - Investigators observed signage on the equipment and at the station outlining rules and a code of conduct for riding the BART system.

- Powell St. Station
    - The Group determined there was ambient lighting in the Powell St. Station. The lighting present is the newer standard which is LED lamp lighting. This lighting appeared to provide greater illumination then the older fluorescent lamp lighting.
    - Station platform was clear of debris, passenger count was approximately 150-200 people between 4:30 p.m. and 5:30 p.m. There were unobstructed sight lines of the yellow tactile on both platform edges.
    - The group observed that the walking conditions were regular and even and free of obstructions.
    - The group noted that there were no physical or permanent obstructions to obscure an operator's line of sight on the platform.

- Investigators observed signage on the equipment and at the station outlining rules and a code of conduct for riding the BART system.
- The group observed several trains servicing this station and passenger behavior. Passengers frequently walked over the tactile strip while trains were stationary, in movement, and not present in the station. The group observed several passengers who appeared to be intoxicated or under the influence of behavior altering substances. Several passengers had bicycles with them. The group observed some passengers riding bicycles on the station platform. The group also observed a passenger with a dog and a shopping cart. The dog's handler used a retractable style leash to corral the dog. At times, the leash extended approximately 6ft. away from the handler. The handler boarded a train with the dog and shopping cart.
- The group conducted a sight distance observation by placing a BART employee at the boarding location of the deceased passenger. Investigators conducted observations down the platform from the operating compartment of an exemplar train set.
    - The BART employee was wearing a burgundy polo shirt and khaki pants.
    - The BART employee stood on the tactile strip at the 9th car, 2nd door boarding location.
    - When looking from the operating cab down the station platform, investigators observed that the BART employee was difficult to see.
    - The operator of the exemplar train performed the same observation and stated that she was able to see the BART employee because she was only focusing on the yellow tactile stripping. Investigators again looked down the platform utilizing this same technique and were able to see that the BART employee was standing on the platform. The operator explained that her technique comes from training and experience.
    - Investigators observed that an audible alarm and light would activate in the cab signaling the operator to close the doors, at this point the operator would activate the door closing function, lights on the exterior of the train would extinguish as the doors would close on each car. Once this was completed, the train would begin moving in the direction of travel as the operator continued to scan the platform along the rear of the train for approximately 1-3 seconds.

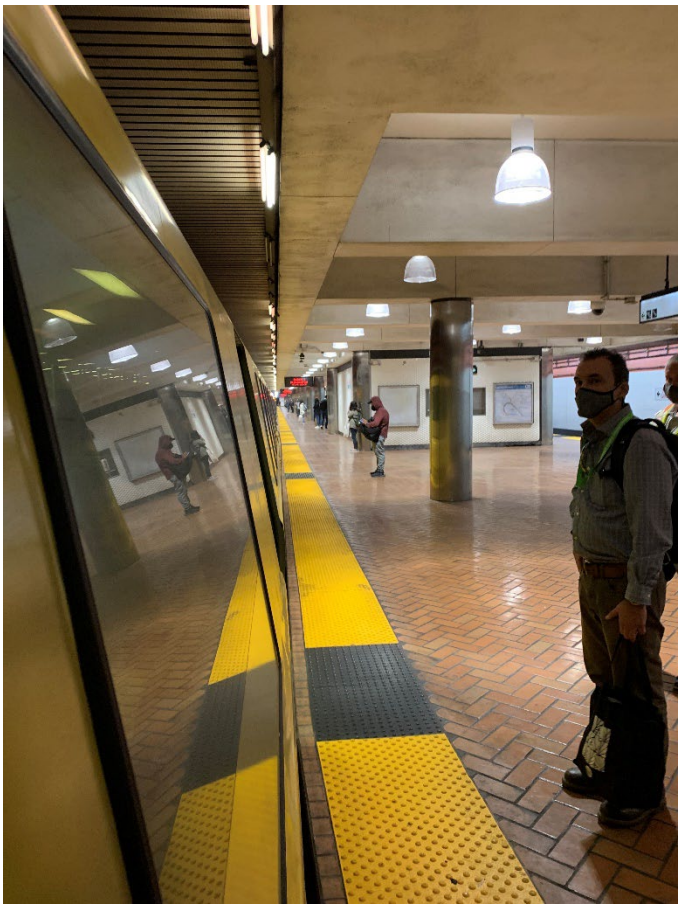


Figure 3: Photo of the tactile strip at Powell St. Station from the operating compartment window of an exemplar train. The BART employee can be seen at the end of the platform standing on the tactile strip near the 2nd doorway of the 9th car.

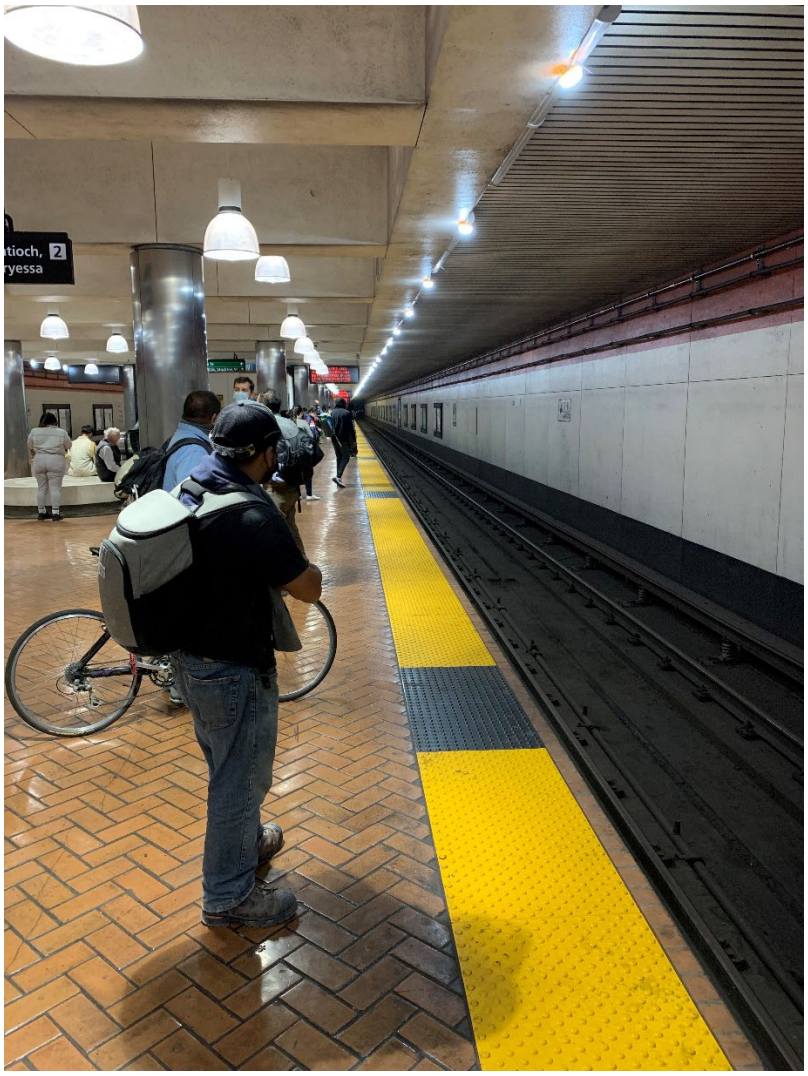


Figure 4: View of the tactile strip from the boarding position of the 2nd door, 9th car looking in the direction of travel.

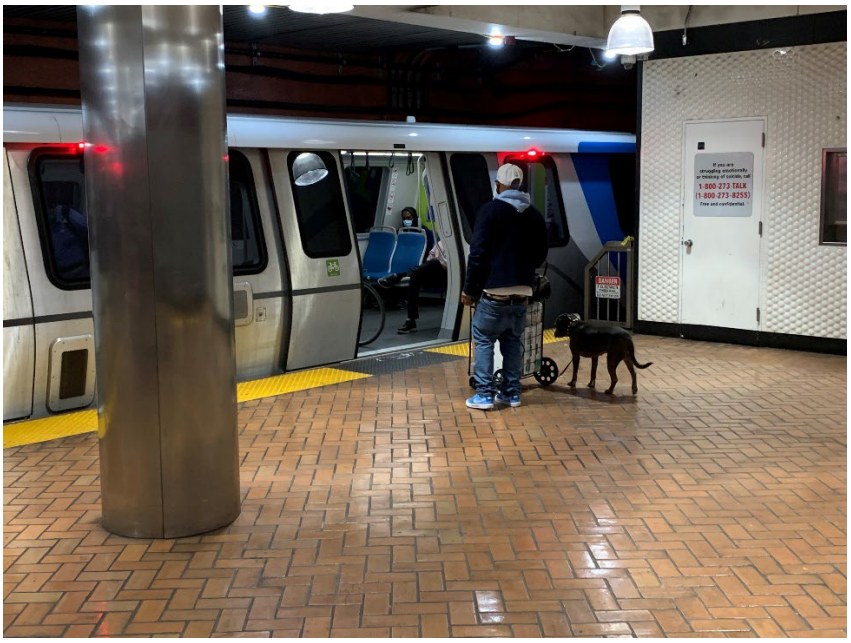


Figure 5: Passenger with dog on retractable leash and shopping cart boarding train.


Figure 6: Platform edge gap at Powell St. Station

- Return train ride and Lake Merritt Station

- The operator made announcements before station stops informing passengers of the next station, and what side that the doors would be opening on. While servicing station platforms, the operator made informational announcements to passengers. Door chimes were present immediately before and during the door closing process. Additionally, red blinking lights alternated as the door cycle activated and completed.
- While on the train, investigators were approached by an individual who appeared to be under the influence of a behavior altering substance, the individual was riding their bicycle on the train and made threating comments to an investigator. Investigators and BART employees were wearing reflective vests. The individual followed passengers off of the train at the Lake Merritt Station and began riding their bicycle on the station platform circling the Investigative team. At one point during the encounter, the individual almost rode their bicycle off the station platform. BART police at the station were informed of the encounter.
- Investigators observed signage on the equipment and at the station outlining rules and a code of conduct for riding the BART system.

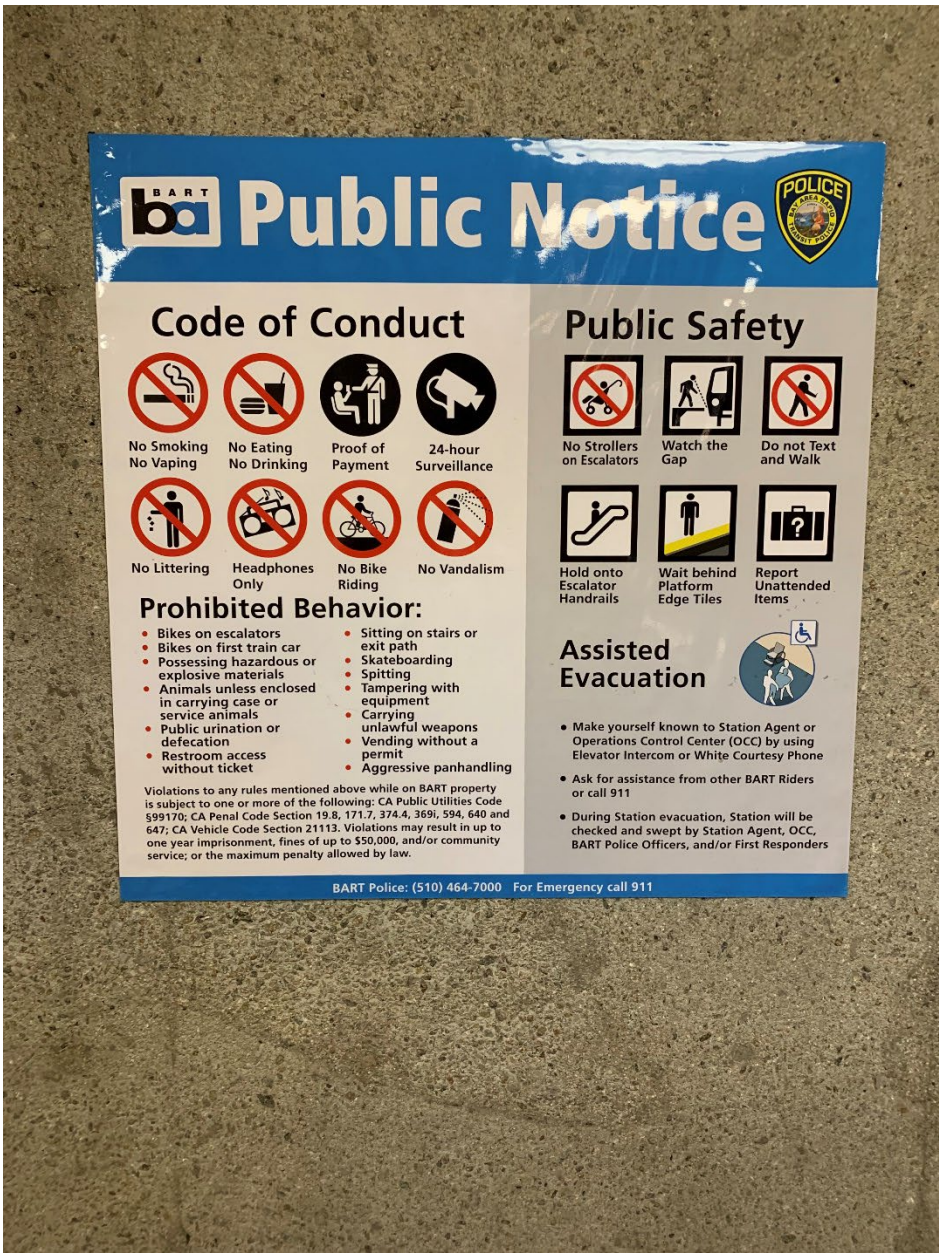


Figure 7: Code of Conduct and Prohibited behavior posted in BART system

Figure 8: Individual riding bike on the platform at Lake Merritt Station

- Observations from accident train located on track 16 at Concord Maintenance Yard
    - Investigators observed the operation of the doors from the accident car and door set. The operator made announcements that were heard within the car. Door chimes were present immediately before and during the door closing process. Additionally, red blinking lights alternated as the door cycle activated and completed.
    - Investigators placed several objects into the door to observe a door malfunction. During the malfunction the door would release slightly, an audible alert stating "the doors on this car are obstructed, please stand clear of the doors so the train can depart" can be heard, and red blinking lights alternated while the audible announcements were made. When the object was removed, the door would shut.
        - Investigators were able to obstruct the doors with their boots, arms, and hands, and a sharpie pen.
        - Thinner items such as a work glove and phone charging cord did not activate a door malfunction and were not movable once the doors had closed.
    - Investigators observed signage on the equipment outlining rules and a code of conduct for riding the BART system.

- Investigators also noted the location of the emergency door release on the interior of the car.

Look Back Procedures at other rail transit agencies

*Rules and procedures from MARTA, NYCT, and WMATA are included in Appendix A.

Parties represented on the Operations Group - Acknowledgment Signatures

_____//s//_____ Date ____2/22/22_____
Ryan J. Frigo, NTSB

_____//s//_____ Date ____3/10/22_____
Bernardo Bustamante, FTA

__ _____//s//_____ Date ___3/10/22_____
Roy Aguilera, BART

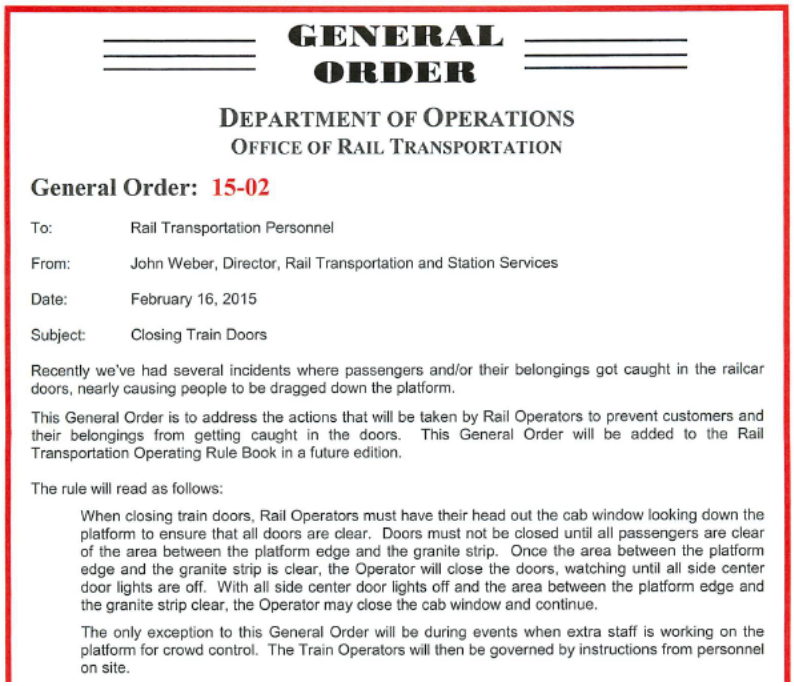
__ _____//s//_____ Date ____3/10/22_____
Robb Bury, BART

__ _____//s//_____ Date __3/10/22_____
Michael Borer, CPUC

__ _____//s//_____ Date ___3/10/22_____
Jesse Hunt, ATU

APPENDIX A:

MARTA



GENERAL ORDER

DEPARTMENT OF OPERATIONS
OFFICE OF RAIL TRANSPORTATION

General Order: 15-02

To: Rail Transportation Personnel

From: John Weber, Director, Rail Transportation and Station Services

Date: February 16, 2015

Subject: Closing Train Doors

Recently we've had several incidents where passengers and/or their belongings got caught in the railcar doors, nearly causing people to be dragged down the platform.

This General Order is to address the actions that will be taken by Rail Operators to prevent customers and their belongings from getting caught in the doors. This General Order will be added to the Rail Transportation Operating Rule Book in a future edition.

The rule will read as follows:

> When closing train doors, Rail Operators must have their head out the cab window looking down the platform to ensure that all doors are clear. Doors must not be closed until all passengers are clear of the area between the platform edge and the granite strip. Once the area between the platform edge and the granite strip is clear, the Operator will close the doors, watching until all side center door lights are off. With all side center door lights off and the area between the platform edge and the granite strip clear, the Operator may close the cab window and continue.
>
> The only exception to this General Order will be during events when extra staff is working on the platform for crowd control. The Train Operators will then be governed by instructions from personnel on site.

40.5.3 Door Closing Procedures:

40.5.3.1 Prior to initiating the Close Door button, the train operator shall check the operating console for speed commands and check Roadway ahead of the train to ensure it is clear.

Notice: After servicing the station, the operator must contact ROCC for permission to leave and an absolute block for the move if speed readouts do not return (see Rule 3.79).

40.5.3.2 When passenger flow has subsided, initiate the Close Door button while constantly observing the train doors closing and passengers on the platform.

40.5.3.3 If any object/customer is caught in the train doors or the door indicator lights fail to extinguish, immediately recycle train doors. Be aware that small items such as clothing can be caught in the doors and NOT cause a loss of All Doors Closed Indication. Do not allow the train to move until it has been verified that it is safe to do so.

40.5.3.4 Do not recycle train doors after all the exterior door indicator lights are extinguished and you have verified that it is safe to move.

40.5.3.5 At center platform stations, when in ATO Operation, continue to observe passengers on the platform for a moment after the train begins to move in ATO. If no problems are observed on the platform, close the window and look in the direction of travel as you continue ATO operation.

40.5.3.6 At side platform stations, when in ATO operation, as the train begins to move and no problems are observed on the platform, close the window and look in the direction of travel as you continue ATO operations.

40.5.3.7 At center platform stations, when in Manual Operation, use extra care checking the platform for door obstructions/articles caught in the doors. If no problems are observed on the platform, close the window, and look in the direction of travel as you return to your seat to resume manual train operation.

40.5.3.8 At side platform stations when in Manual Operation, using extra care to ensure that no problems are observed on the platform, close the window and look in the direction of travel as you resume manual train operation.

TRAIN OPERATION

Rule 5.05

DEPARTING STATIONS

5.05(a) From Terminals

Train Operators assigned to One Person Train Operation service must be on their trains at least two minutes before their scheduled departure time from terminals with all train identification equipment properly displayed and in place.

5.05(b) Upon the illumination of the Starting Lights, the Train Operator shall proceed to close the doors of his/her train as follows:

1. Insert Master Door Control key into key switch and turn to "ON."
2. Make required PA announcements alerting customers to "stand clear of the closing doors, please."
3. Observe platform from side window and CCTV monitor where installed, and when safe to do so, operate the door closing button on the Master Door Control.
4. Ensure by careful observation, that all customers and their belongings are clear of the doors and clear of the side of the train.
5. When all side doors are closed and locked, the Master Door Control indication light will illuminate.
6. Observe platform from side window and CCTV monitor where installed to once again ensure that all customers and their belongings are clear of the doors and clear of the side of the train.
7. Turn Master Door Control Key Switch to the "RUN" position, check for the **"ALL CLOSED"** indication on the Master Door Control Panel remove key and return to the operating console.
8. When available, and visible from the operating console check CCTV monitor to ensure that all customers and their belongings are clear of the doors and clear of the side of the train prior to moving.
9. Observe that the Train Operator's indication is illuminated and proceed to the next station stop, obeying all wayside signals and observing the right-of-way.
10. When the side doors are open, moving the operating key switch to the **"RUN"** position will automatically close the doors. The use of this method to close train doors is strictly prohibited.