



**Los Angeles County  
Metropolitan Transportation  
Authority**

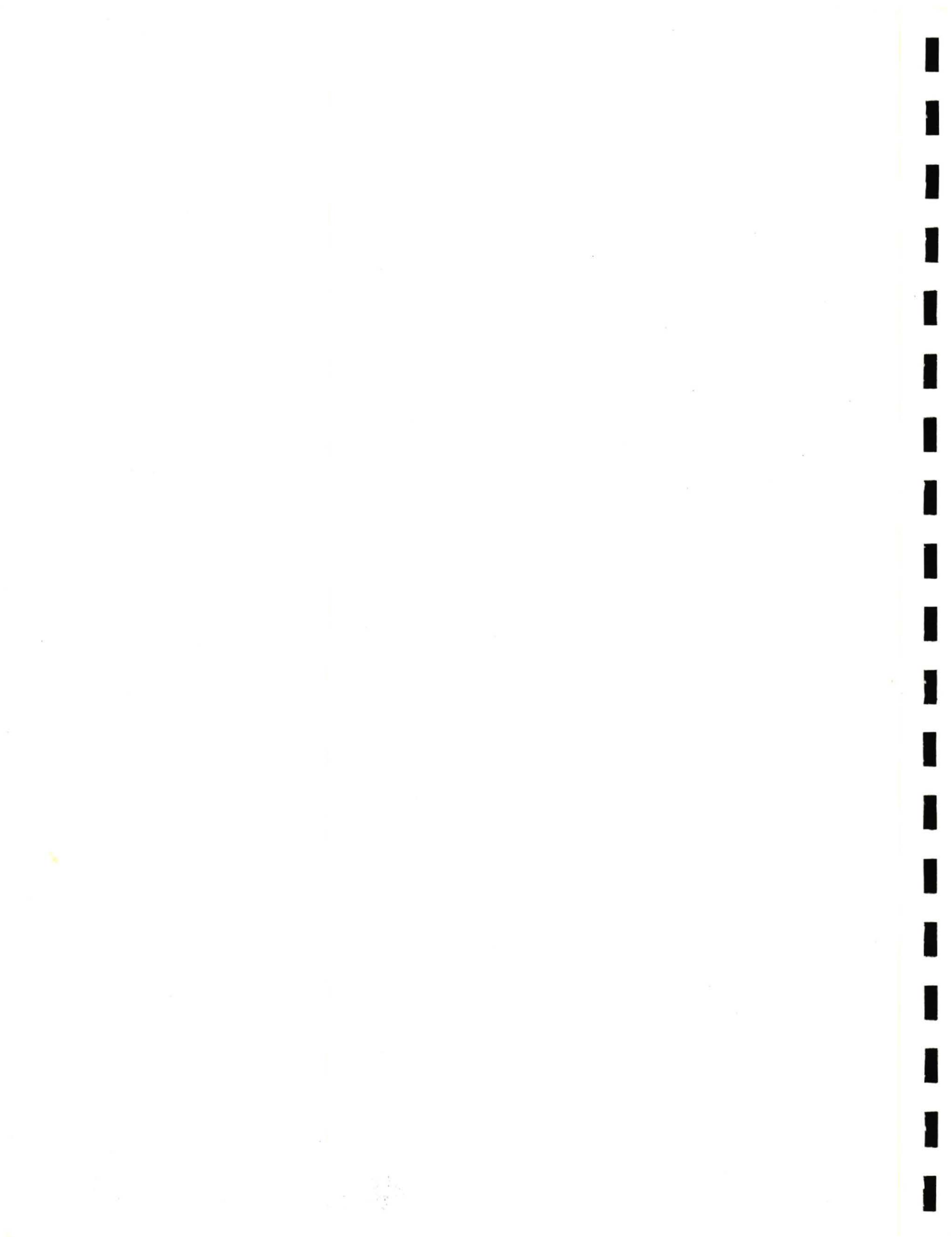
**Metro Red Line Heavy Rail Line: Los Angeles - Wilshire  
Corridor - Segment 1, 2A and 2B**

REFERENCE ONLY

# **FAMILIARIZATION AND CHARACTERISTICS OF THE METRO RED LINE**



HE  
4491  
.R42  
F326



34554808

**FAMILIARIZATION  
and  
CHARACTERISTICS  
of the  
METRO RED LINE**

Produced by:  
LACMTA  
Red Line Rail Operations

**MTA LIBRARY**



## TABLE OF CONTENTS

Purpose of this Manual .....	4
History of Metro Red Line .....	5
Rail Control Center and Yard Control .....	6-7
Rail Vehicle Characteristics .....	8
Car Exterior .....	9
Car Interior .....	10-11
Break or Distance between Contact Rail Section.....	12-13
Illustrations of Emergency Door Entry .....	14
Mainline Characteristics .....	15-16
Access to Right of Way (R.O.W.) .....	17
Traction Power Substations/TPSS .....	18
Typical Traction Power Building .....	19
Traction Power Substation Addresses .....	20
Future Metro-Red Line Substations .....	21
Contact Rail System .....	22-23
Station Characteristics .....	24-26
Wilshire Corridor Station & Tunnel Configuration.....	27
Fare Collection For Metro Red Line .....	28
Heavy Rail Security .....	29
Emergency Situations .....	30-33
Upcoming Emergency Scenarios .....	34
Important Addresses/Phone Numbers .....	35-36
Definitions .....	37-44

HE  
4491  
.R42  
F326

20817

APR 16 1996

## **PURPOSE**

The purpose of this manual is to familiarize Emergency Response Agency Personnel with operating characteristics and unique features of the Los Angeles County Metropolitan Transportation Authority's (LACMTA) Metro Red Line.

This manual will also provide a general overview of the Heavy Rail System, including explanations on the vehicle, traction power distribution system, mainline right-of-way and other important elements within the system.

## **OBJECTIVE**

The objectives of this manual are threefold:

To generate common knowledge among personnel in Emergency Response Agencies, such as Law Enforcement, Fire and Paramedic Units, and to enhance their response with Rail Personnel, when emergency interaction between agencies is required.

To minimize potential danger to passengers and emergency response personnel.

To maximize the effectiveness of the responding agencies in emergency situations by increasing their knowledge of the Metro Red Line Rail System.

## HISTORY OF METRO RED LINE

The Metro Red Line is a Heavy Rail Transit System designed, built and operated by the Los Angeles County Metropolitan Transportation Authority (LACMTA) and financed by federal funding, Proposition A (1/2% sales tax) and two statewide tax measures for Public Transit.

The initial groundbreaking ceremony for the Red Line was held at 1st and Hill Sts. in 1986. The Metro Red Line commenced passenger operations on January 30, 1993 with the first segment consisting of five stations. Each segment is designed as Minimum Operating Segments (MOS), followed by the segment numbers. It is currently designed to be built in three segments, with plans for future east and west extensions.

The Metro Red Line has a bore configuration which is currently in place from Union Station, downtown Los Angeles to Wilshire and Alvarado Street in the Mid-town Wilshire district. Currently, there are five passenger stations in the subway system, with three additional stations to be opened in the summer of 1996 (Vermont, Normandie and Western Ave. stations).

MOS-1 begins at Union Station. It then turns southwesterly to 1st and Hill Street (Civic Center Station). From Civic Center, the line proceeds south under Hill Street to 5th Street, where it makes another stop at Pershing Square Station. Curving southwesterly again, it continues to the Metro Center Station under 7th and Flower Streets, where it connects with the Metro Blue Line. It then continues along 7th Street under the Harbor Freeway, to Wilshire and Alvarado (MacArthur Park Station).

The next segment, MOS-2A, will continue westbound beneath Wilshire Blvd. to (Vermont Station) where it will continue northbound and westbound branch from Vermont to Western. The next segment to be opened will be MOS-2B, with three additional stations on Vermont Ave. They are: Vermont/Beverly, Vermont/Santa Monica and Vermont/Sunset Stations. The final phase of MOS-2 stations are Hollywood/Western and Hollywood/Vine Stations and will be opened at a later date.

Once this segment is completed, MOS-3 will continue on to the San Fernando Valley, MOS-3, under and through the Hollywood Hills. The projected terminal in the Valley will be at the intersection of Lankershim and Chandler Boulevards. The entire Metro Red Line is scheduled for completion in the year 2003.

The Metro Red Line also interfaces with Metrolink trains at Union Station with transfer connections to Moorpark, Santa Clarita, San Bernaidino and Riverside. Claremont, Anaheim and San Fernando. In addition to Metrolink transfer points, at 7th/Metro Center passengers will be able to transfer southbound to Long Beach on the Metro Blue Line Trains. Future plans call for an extension of the east terminal at Union Station with connections to East Los Angeles communities.

# **RAIL CENTRAL CONTROL FACILITY AND YARD CONTROL**

## **RAIL CONTROL CENTER**

The Rail Central Control Facility, staffed by Rail Transit Operations Supervisors, is the nerve center for Rail Operations. This facility is located at 2000 East Imperial Highway, in the city of Los Angeles. The facility operates 24 hours per day, 365 days per year. The Rail Controllers work closely with Law Enforcement, Rail Operations Supervisors, Train Operators, Closed Circuit T.V. Monitors, Equipment Maintenance and Facilities Maintenance Personnel. In addition, contact with Bus Dispatchers and Bus Operators enhances Rail Operations. Radio and telephone communications link the Rail Controller with the personnel vital to Rail Operations.

The Rail Controller is also able to monitor a variety of critical functions vital to the system by means of Supervisory Control and Data Acquisition. (S.C.A.D.A.)

Some of the functions that are monitored by SCADA are:

- Traction Power and related facilities
- Train Control and Communication Buildings
- Track Circuitry
- Passenger Stations
- Building Intrusion Detection
- Fire Detection at vital facilities
- Radio Communication Systems
- Station Ticket Vending Machines

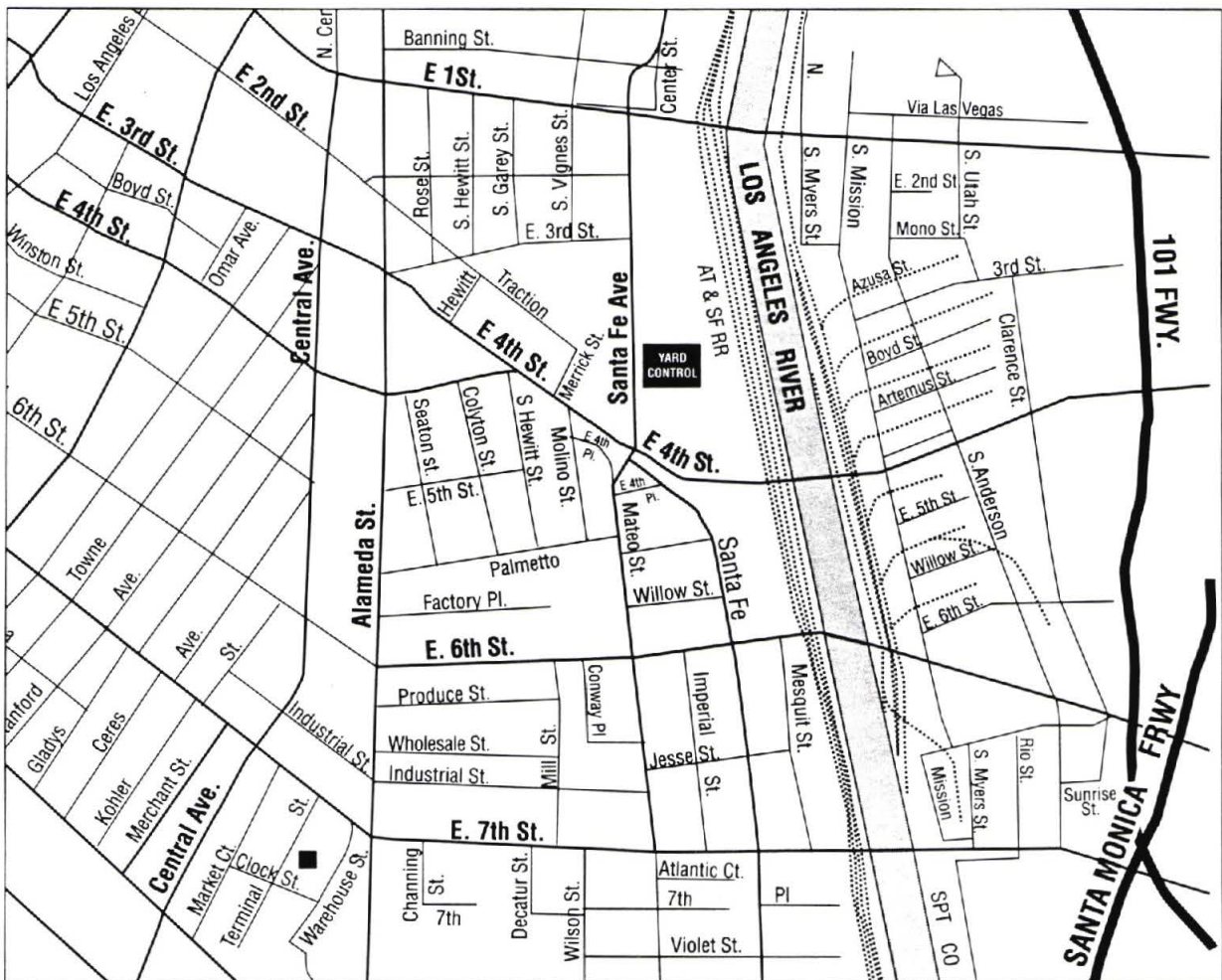


## YARD CONTROL

The Yard Control Facility includes a combined Vehicle Maintenance, Maintenance of Way (MOW) and Operations building located at 320 South Santa Fe Ave. in the city of Los Angeles, CA. 90013. Tracks adjacent to the buildings are for maintenance, storage and movement of the Heavy Rail Vehicles. A Yard Controller is on duty 24 hours a day, 7 days a week. From the Yard Control Tower, trains can be routed automatically and manually within the Yard Limits, through switches and signals by the use of the General Logic 1 (GL-1), more commonly known as the NX Panel.

The Yard Controller is responsible for all train movement in the yard only and assuring the dispatch of the proper number of Heavy Rail Vehicles onto the mainline at predetermined scheduled times, along with scheduled train operations to maintain passenger service. The Yard Controller also assure replacement vehicles being available for mainline breakdowns with coordination of the Equipment Maintenance Department.

In the event of an emergency, should Central Control Facility (CCF) become disabled, Controllers can operate a secondary SCADA system located at the Yard Control Tower, for mainline operations.



## RAIL VEHICLE CHARACTERISTICS

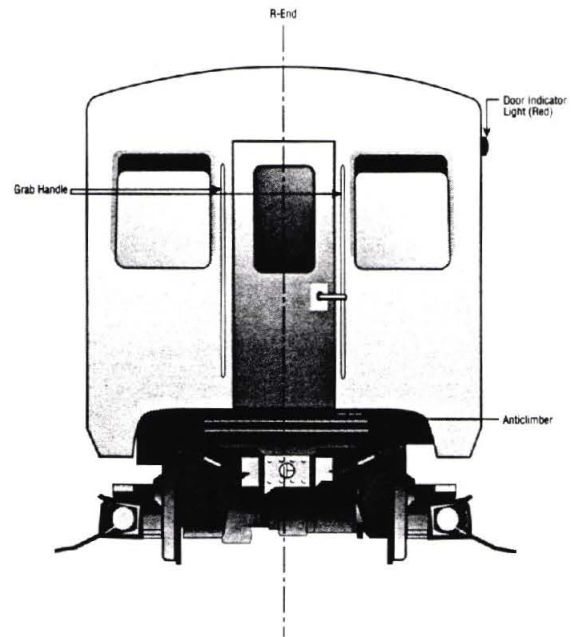
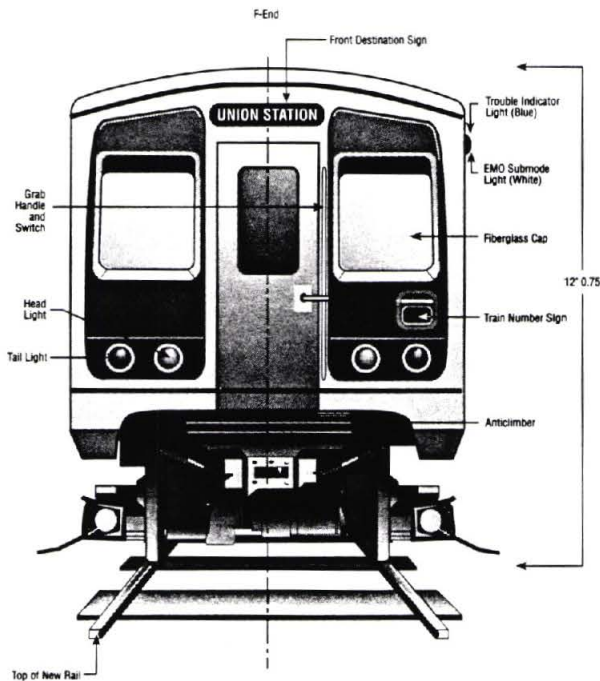
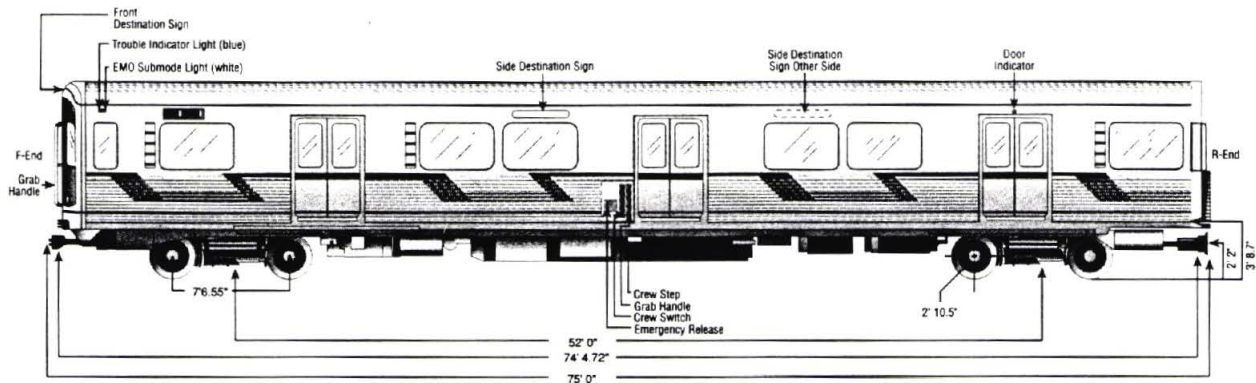


CONSTRUCTION:	Stainless steel fastened by welding of flush riveting end underframe. Fiberglass reinforced plastic outer shell at cab end.
SUPPLIER/ MANUFACTURER:	Breda Costruzioni Ferroviarie Societa per Azioni Italy.
PROPULSION:	Four traction motors per car operated from 750 VDC.
BRAKING:	Pneumatically actuated friction brakes at each wheel. Dynamic regenerative braking through propulsion system. Hand operated mechanical parking brake.
CAR CONFIG.:	One A car and one B car, minimum operating vehicle. Six car consist, maximum.
CAR LENGTH:	75 feet.
CAR WIDTH:	10 feet, 4 inches.
CAR HEIGHT:	12 feet, 7 inches.
CAR WEIGHT:	80,000 pounds.
WHEEL DIAMETER:	34.5 inches.
SEATED LOAD:	59 passengers, (1 wheel chair space.)
STANDING/SEATED:	169 Passengers (220 crushload).
MAXIMUM SPEED:	70 miles per hour.
MAXIMUM ACCELERATION:	3 miles per hour per second.
FULL SERVICE BRAKING:	3 miles per hour per second.
EMERGENCY BRAKING:	4.2 miles per hour per second.
ELECTRICAL POWER REQUIREMENTS:	750 VDC nominal supplied from contact rail. Used for traction motors, converter, air compressor, heating elements, air conditioning, evaporator and condenser.
NUMBER ORDERED:	30 (Segment 1) = 15 married pair.

**NOTE:** Rail Vehicles manufactured by Breda Costruzioni Ferroviarie will be ordered and delivered to the Metro Red Line System by September 1996. This document will be updated at that time to show the different vehicle characteristics.

## CAR EXTERIOR

The passenger vehicles operating on the Metro Red Line are built by Breda Construzioni Ferroviarie of Italy. These cars operate as dependent pairs and are assembled so that a cab is placed at each end of a pair to enable bi-directional travel. The Operator's cab is equipped with all the controls and indicators needed for one person to operate a multi-car train. Panels and doors separate the cab from the passenger compartments. There are two trucks per car. Truck assemblies support the vehicle and contain vital parts such as the wheels, axles, traction (electrical) motors, gear boxes and friction brakes.

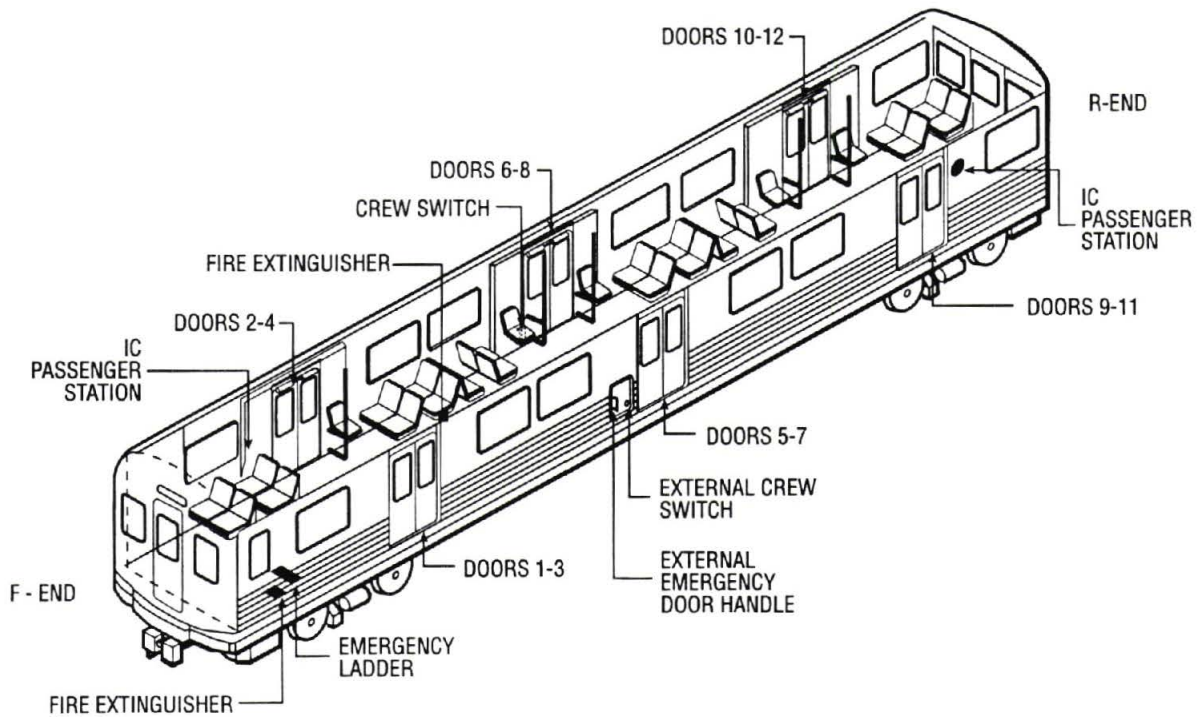


## CAR INTERIOR

Each car seats 59 passengers, along with one wheelchair space, but can accommodate 220 passengers in a standing "crush load". The cars are designed with end doors between them, thus allowing movement by passengers from one car to the other, only during emergencies. Most of the seats are arranged to accommodate two passengers in a transverse arrangement. Fluorescent light fixtures are installed in the passenger compartment to provide illumination of the passenger entrances and seating areas. The lights are automatically activated when the train is energized with auxiliary power.

Each car is equipped with two (2) 10 pound (4.5KG) Foray multi-purpose dry chemical fire extinguishers. These extinguishers, classified at 10-A,60-BC, are located in each cab behind the Operator's seat and one between the transverse arrangement in the passenger seats.

There are two (2) Passenger Intercoms (IC) push button controls per car for emergency communication with the Train Operator. These controls illuminate when a passenger depresses the push button switch on the intercom unit.



## **WINDOWS**

A dependant pair contains 24 glazing glass passenger windows which provide passenger viewing and cannot be opened. Ventilation for the passengers and operators' cab is provided by an air conditioning system.

## **DOORS**

There are six (6) double-sliding doors on each side of a dependant pair. Door operation is controlled from the operating cab and allows the Operator to open all doors on either or both sides of the train.

## **BATTERY**

The batteries are Nickel Cadmium and located in the "B" car. The car battery supplies 37.5 VDC to the interior lighting system, doors and the air conditioning system in the event of loss of traction power.

## **EMERGENCY DOOR OPERATION**

All doors may be manually opened in an emergency from inside the car by pulling downward on the inside emergency Red Ball located just above each set of doors. Once the handle is pulled down, the air to the door is released and the doors can be manually separated. When activated, the train comes to a complete stop. (See illustration on the next page.)

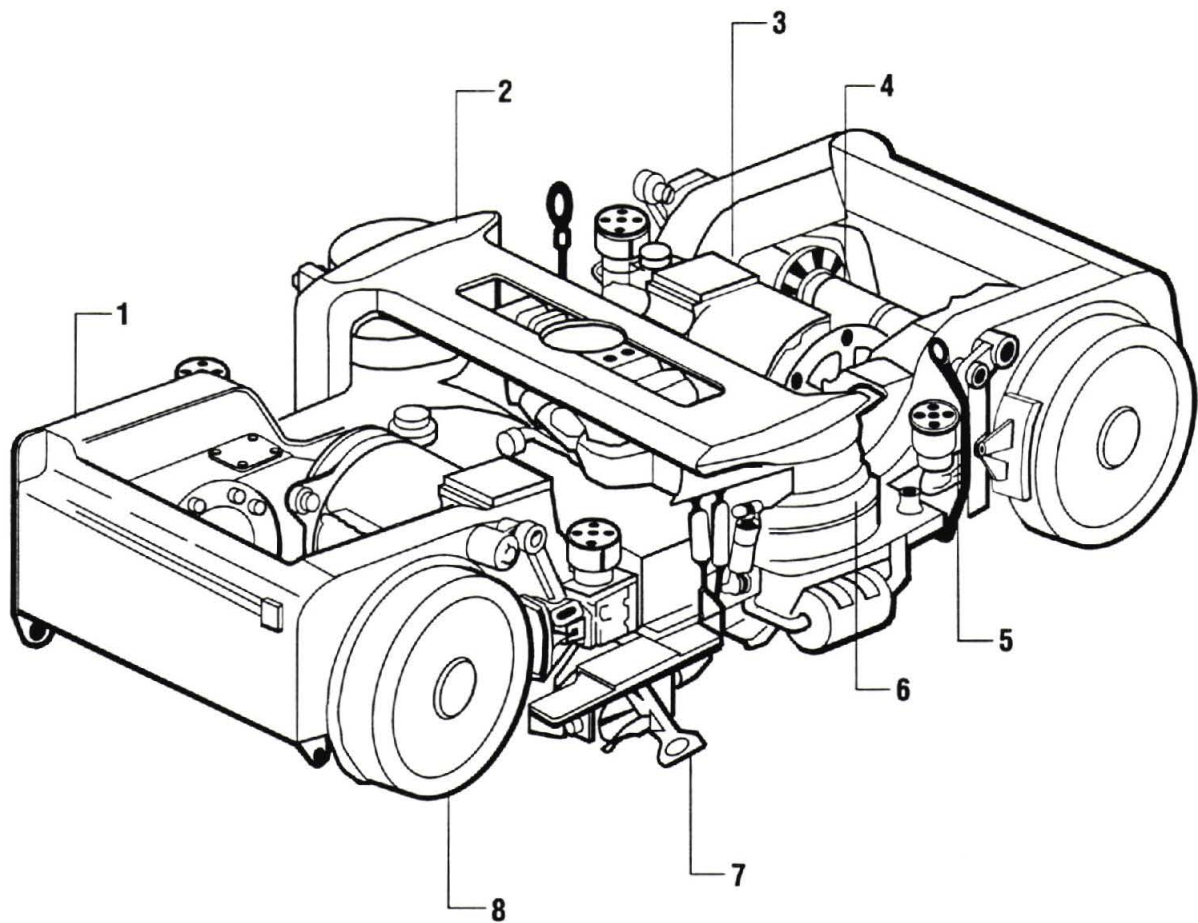
For personnel outside the vehicle of a dependant pair, entry can be gained by use of four (4) doors that may be opened from the outside of the train. These small access doors are located on each side of a car at the center section adjacent to the passengers doors # 5 & 7 and # 6 & 8. This access can be achieved with the External Crew Switch, which requires a barrel key. The other, is by the use of the External Emergency Door Handle, which must be pulled to release the air. After waiting 5 seconds, the doors may be manually separated.

If entry into the Operating Cab of either end of the dependant pair of a train is required, a barrel key is necessary to unlock the "F" end doors.

## BRAKES

There are two types of brakes on each vehicle: dynamic and friction brakes. Normal braking is a combination of dynamic and friction brakes referred to as blended braking. Dynamic braking is the primary braking system in which electric current, derived from the motors, acts as a generator and provides controlled braking.

Full service braking is the maximum braking that can be obtained without going into an emergency stop condition. Emergency braking is the maximum braking that can be obtained, but once activated cannot be released until the train has come to a complete stop and required associated actions are initiated.

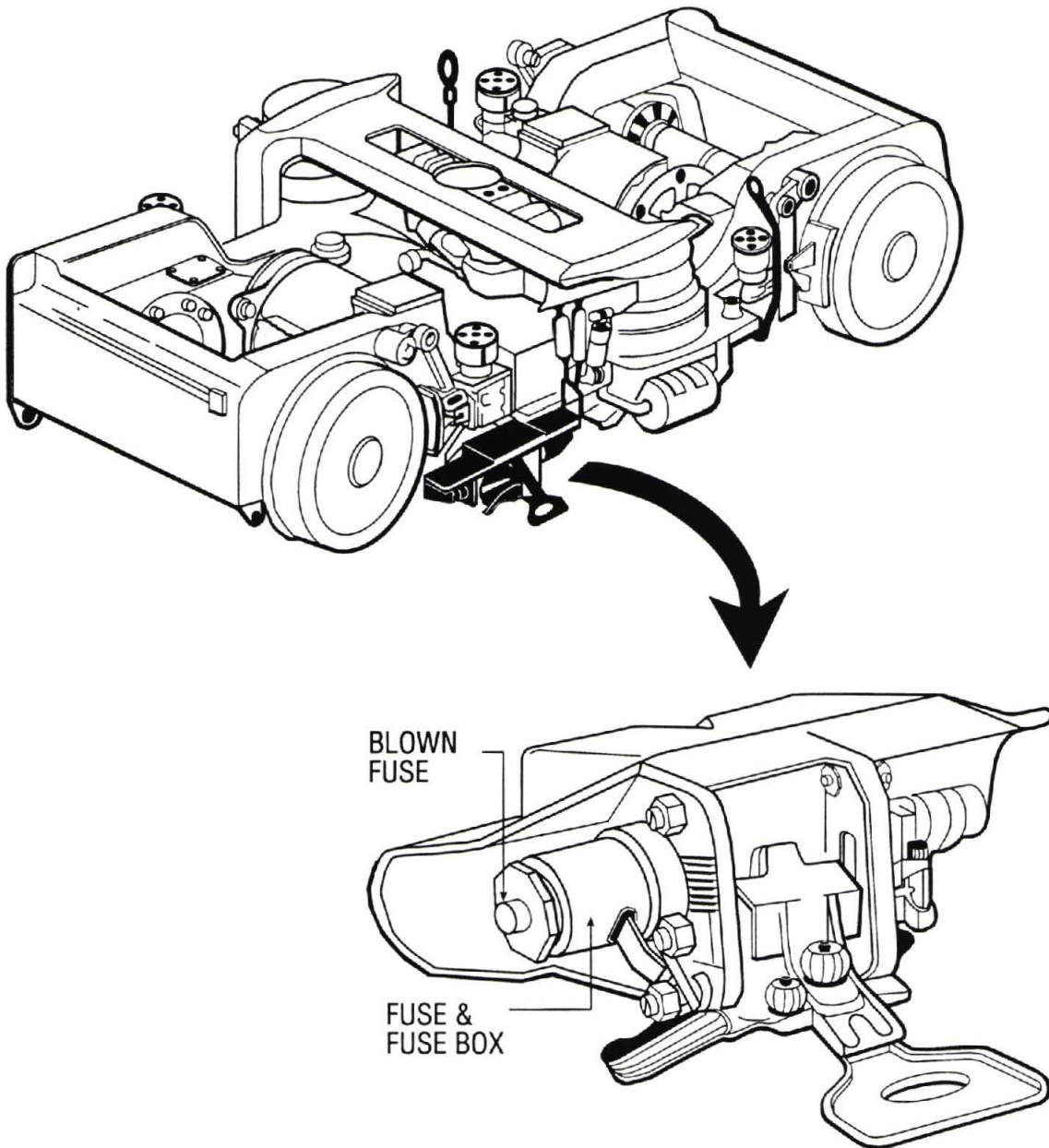


1. Fram Assembly
2. Bolster Beam
3. Motor Gear Unit
4. Primary Suspension

5. Shoe Brake
6. Air Bag
7. Current Collector
8. Wheel Set

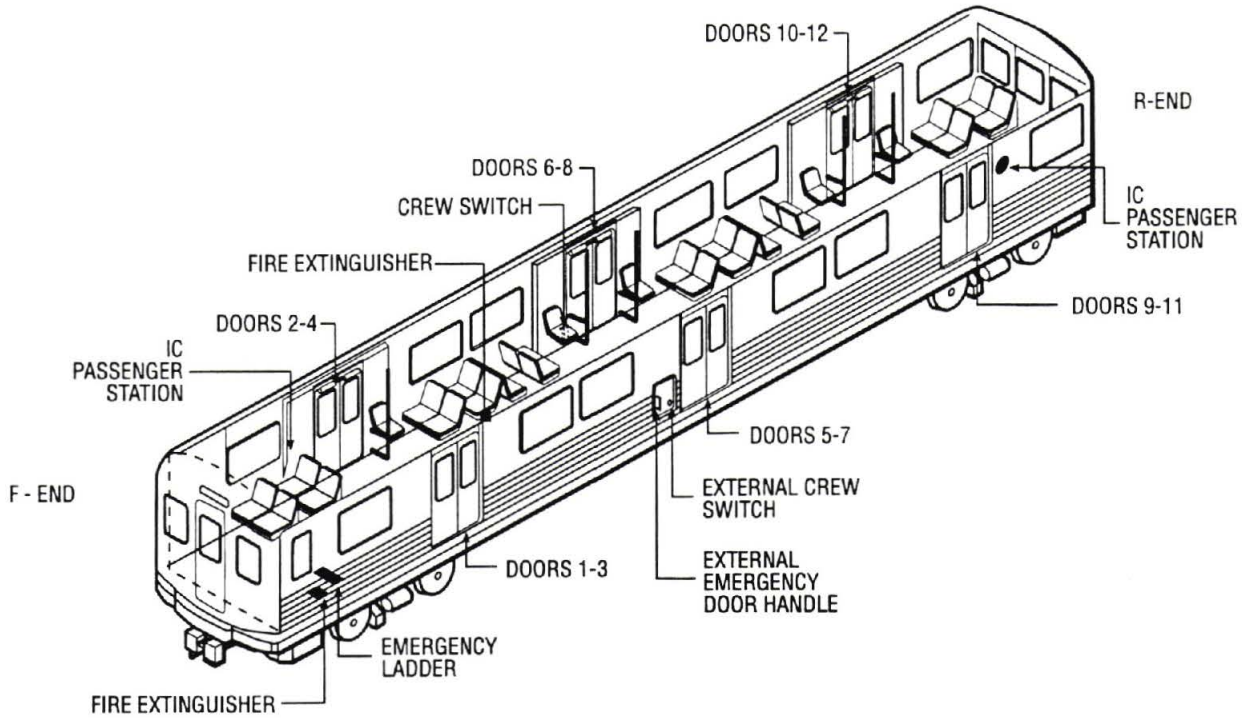
## CONTACT RAIL SYSTEM-COLLECTOR SHOE

The Contact Rail system is where the electrical conductor (rail adjacent to running rail) provides the 750 VDC direct current to the vehicle through contact with the current collector shoes on the vehicles trucks. The collector shoe is that part of the current collector assembly that slides along the electrified contact rail to conduct primary power to the vehicle, and return regenerative braking power from the vehicle to the contact rail. There are four (4) collector shoes on each car. When one collector shoe is energized by making contact with the contact rail, all collector shoes are energized.

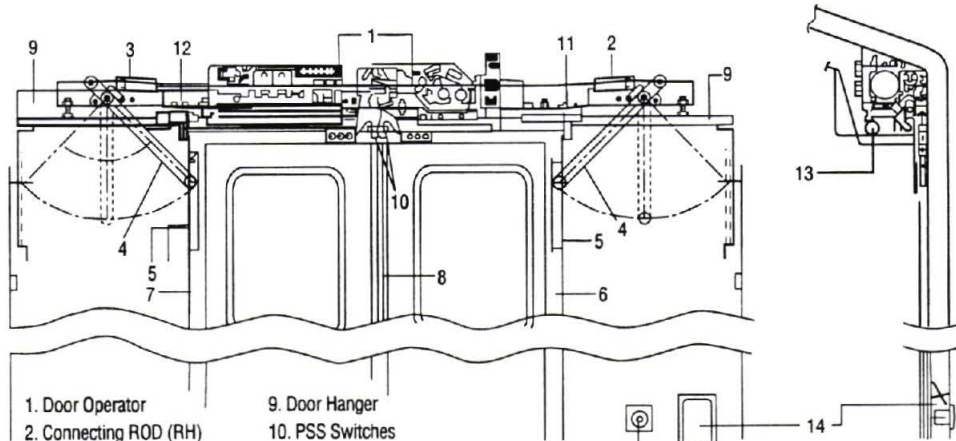


# ILLUSTRATIONS OF EMERGENCY DOOR ENTRY

## OUTSIDE



## INSIDE



- |                        |                                     |
|------------------------|-------------------------------------|
| 1. Door Operator       | 9. Door Hanger                      |
| 2. Connecting ROD (RH) | 10. PSS Switches                    |
| 3. Connecting ROD (LH) | Actuating Pins                      |
| 4. Multiplying Lever   | 11. Mechanical Lock (RH)            |
| 5. Door Slide          | 12. Mechanical Lock (LH)            |
| 6. Door Panel (RH)     | 13. Inside Emergency Handle (Center |
| 7. Door Panel (LH)     | Doors Only)                         |
| 8. Door Edges          | 14. Outside Emergency Handle        |
|                        | (Center Doors Only)                 |
|                        | 15. Outside Crew Key Switch         |
|                        | (Center Doors Only)                 |



# MAINLINE CHARACTERISTICS

## CAB SIGNALS

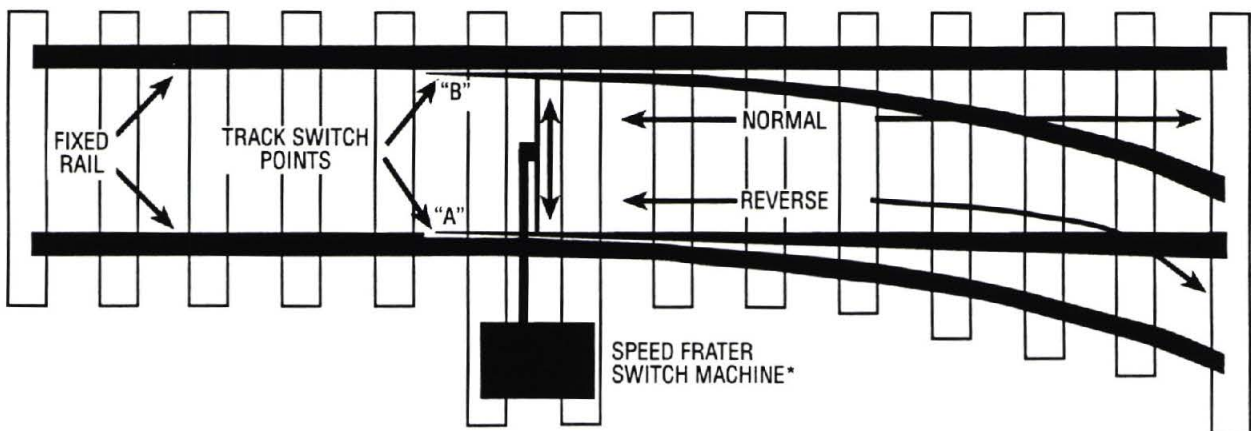
Cab Signals primary functions are to maintain safe distance between trains to ensure separation of all trains in the system. The Automatic Train Protection System, (ATP), assures train detection, separation and regulation. ATP also includes train speeds and provides precise station stopping and train berthing verification. By controlling train speeds, separation distance is maintained. Should one train overtake another and reduce the separation, the Cab Signal System will impose a lower speed, or STOP signal to the offending vehicle to restore the distance.

Speed commands are transmitted to the train through the track rails and picked up by receiver coils mounted under the operating cab of each train. The Train Operator must respond by braking to the displayed speed on the train Operating Console.

Should the Train Operator fail to respond to the speed commands received by the (ATP), an over-speed situation develops and the train will automatically be stopped.

## TRACK SWITCHES

The Metro Red Line contains remote controlled track switches which are used to move a train from one track to another. These same switches can also be manually operated. Remote switches in Cab Signal Territory can move at anytime, in any direction. Always stand clear of all track switches. The illustration below shows points to be avoided on switches.



**NOTE:** Tampering with track switches is prohibited and could potentially cause an accident and/or derailment.

## **MILEMARKERS**

For ease of identification and as a specific reference point, mile post markers are used between eastern and western terminals and are marked every 10th of a mile.

## **CROSSPASSAGES AND EMERGENCY EXITS**

In the event of any possible tunnel evacuation, there are various crosspassages strategically located throughout the tunnel. These crosspassages are used for the transfer of passengers from one bore to another. From west of Westlake Station, some crosspassages are designated as emergency exits to street level.

All crosspassages include a Blue Light Station. At these stations there is a Emergency Trip Station (ETS) box for the purpose of de-energizing a section of track. The ETS box includes an Emergency telephone (ETEL) and Fire Department telephone (FTEL).

At each station, there are emergency exits for the purpose of station evacuation. Emergency exits can be accessed from track level, platform level, mezzanine and ancillary levels.

## **EMERGENCY WALKWAYS**

In an emergency, passengers will always exit according to the instructions received from the Train Operator. There is a designated walkway area through out the Red Line system on both bores of the tunnel to allow emergency personnel access to equipment and trains, and to off-load passengers in cases of extreme emergencies.

***SPECIAL NOTE:*** *Because trains rely on unobstructed tracks to operate, it is essential to maintain at least one clear track whenever there is an accident or incident which requires response and subsequent investigation by local Emergency Response Agencies. It is for this reason that Metro Red Line Rail Operations Supervisor will request at least one track to be opened/cleared when an accident or incident occurs.*

## ACCESS TO RIGHT OF WAY (R.O.W.)

In the event access to the R.O.W. is required in an emergency and entry from platform areas is not practical, emergency personnel have three other options:

1. Ride a train from the opposite direction.
2. Make entry from Emergency Exits and Crosspassages at several locations.
3. Make entry from the Portal or adjacent station platforms.

---

### STREET LEVEL EMERGENCY EXITS

---

STATIONS	HATCHES
UNION STATION	4
CIVIC CENTER STATION	3
PERSHING SQUARE	4
METRO CENTER	13
WESTLAKE STATION	4
MID-TUNNEL (BET. POCKET & VERMONT)	2
VERMONT STATION	11
MID-TUNNEL (BET. VERMONT & NORMANDIE)	2
NORMANDIE STATION	5
WESTERN STATION	6

# TRACTION POWER SUBSTATIONS

## CHARACTERISTICS OF TRACTION POWER

Electrical power for the Metro Red Line is supplied by standard high-voltage AC power service from the City of Los Angeles Department of Water and Power (DWP). There are also two (2) specialized emergency back-up supply units available from diesel generators installed in the Main Yard and at Vermont Station currently maintained by LACMTA traction power personnel.

The standard DWP supply configuration consists of two 34.5 kv feeders distributed from separate buses of a receiving power station. This "dual feed" arrangement ensures that the probability of service interruption due to DWP line or switchgear problems is quite low.

Two DWP feeds enter the Metro Red Line property at each Red Line traction power substation location. A DWP controlled transfer switch selects between the feeds, supplying only one service to each substation at any instant.

In the consideration of the possibility of a catastrophic failure of DWP supply, a third feeder is provided to each traction power substation. This feeder originates from a stationary diesel-engine generator in the Main Yard and at Vermont station and is connected to selected tunnel ventilation fans via a track area conduit and a special bus in each substation. The purpose of this supply is solely to prevent a dangerous accumulation of explosive gas in the tunnel during a lengthy DWP outage.

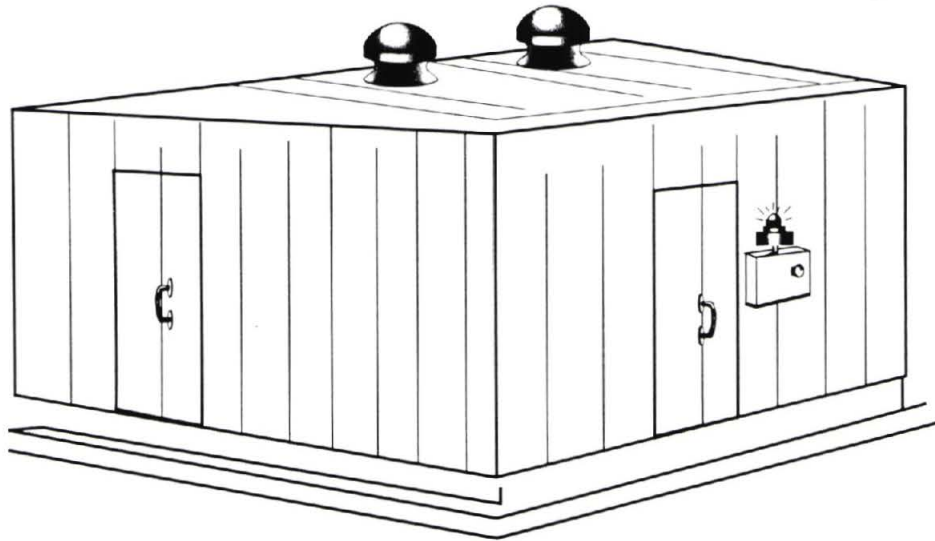
The electrical power system furnishes power to operate passenger vehicles (traction power), passenger station equipment, and other Red Line facilities. The traction power portion of the system is monitored through SCADA and supervised and controlled by Rail Controllers at the Rail Central Control Facility.

A total of ten (10) substations are included as part of the Red Line system in segments 1 and 2A one at each passenger stations along the mainline and one each for the yard and Main Shop bldg. The eight substations along the mainline are located underground in station ancillary areas and require forced-air ventilation for temperature control.

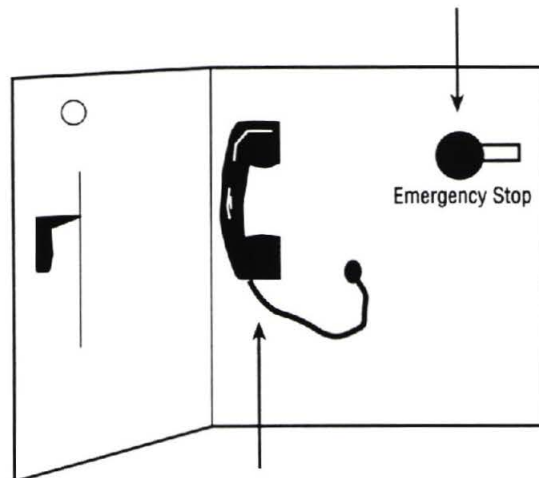
***Note: TRACTION POWER SUBSTATIONS SHOULD ALWAYS BE CONSIDERED ENERGIZED WITH HIGH VOLTAGE POWER AT ALL TIMES!!! TYPICAL TRACTION POWER BUILDING***

# TYPICAL TRACTION POWER BUILDING

Blue Light ETS Indicator



## EMERGENCY STOP BUTTON



IN-HOUSE PHONE

**DIRECT DIAL TO  
CENTRAL CONTROL FACILITY 3-5599**

# TRACTION POWER SUBSTATION (TPSS)

## BUILDING ADDRESSES

The following listing, on file with the City of Los Angeles, contains the permanent addresses assigned to Metro Rail Red Line, Segment 1 and 2A, Substations / TPSS.

#1	320 South Santa Fe Av. (Two Sub.) Power Source: DWP	Los Angeles
#2	801 Vignes Street Power Source: DWP	Los Angeles
#3	101 South Hill Street Power Source: DWP	Los Angeles
#4	500 South Hill Street Power Source: DWP	Los Angeles
#5	739 West 7th Street Power Source: DWP	Los Angeles
#6	660 South Alvarado Power Source: DWP	Los Angeles
#7	3191 Wilshire Boulevard Power Source: DWP	Los Angeles
#8	3510 Wilshire Boulevard Power Source: DWP	Los Angeles
#9	3775 Wilshire Boulevard Power Source: DWP	Los Angeles

## Future Metro Red Line Substations

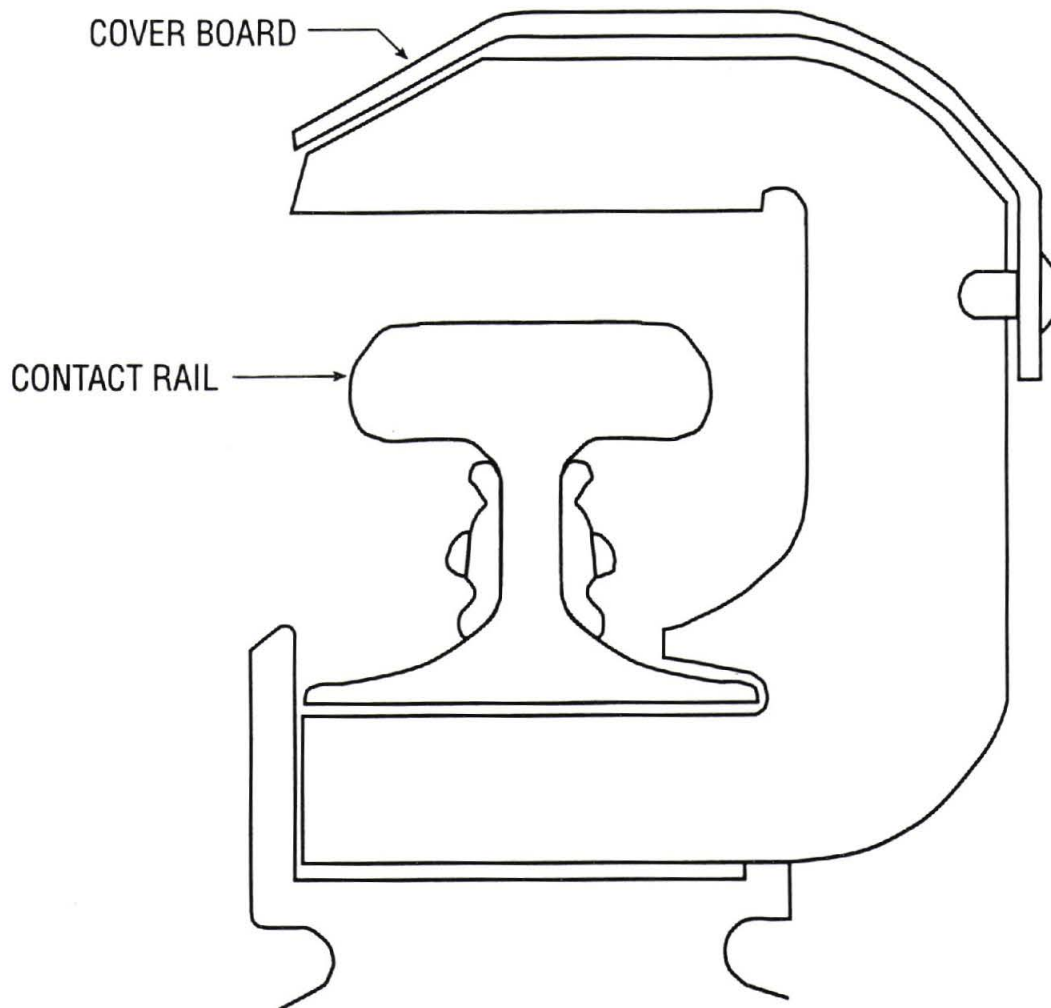
#10	301 North Vermont Avenue Power Source: DWP	Los Angeles
#11	1015 North Vermont Avenue Power Source: DWP	Los Angeles
#12	1500 North Vermont Avenue Power Source: DWP	Los Angeles
#13	5450 Hollywood Boulevard Power Source: DWP	Los Angeles
#14	6250 Hollywood Boulevard Power Source: DWP	Los Angeles
#15	TBD Power Source: SCE	TBD
#16	TBD Power Source: SCE	TBD
#17	TBD Power Source: SCE	TBD
#18	TBD Power Source: SCE	TBD
#19	TBD Power Source: SCE	TBD
#20	TBD Power Source: SCE	TBD

The list of addresses has been filed with the Fire/Life Safety Committee and will be used to expedite emergency responses.

## CONTACT RAIL SYSTEM

The Contact Rail system contains several interdependent components called the Contact Rail, Contact Rail Cover Board. (See illustration below).

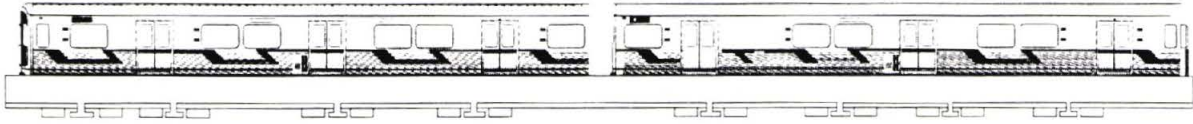
At no time shall any object or person come within 10' of the Contact Rail System without prior approval from Central Control.



**Note:** THE ENTIRE CONTACT RAIL SYSTEM SHOULD BE CONSIDERED ENERGIZED WITH HIGH VOLTAGE AT ALL TIMES.



## CONTACT RAIL SYSTEM (CONT.)



GAP SECTION - A BREAK OR DISTANCE BETWEEN CONTACT RAIL SECTION, WHICH CAN BE BRIDGED BY THE COLLECTOR SHOES OF THE LEAD AND REAR TRACK OF A CAR.



**NOTE:** Non-Bridgeable Gaps in the contact rail longer than the distance between the front and rear collector shoes, (52ft), on the tracks of a single passenger vehicle. This gap causes interrupted traction power to the vehicle for continued rail vehicle movement.

## STATION CHARACTERISTICS

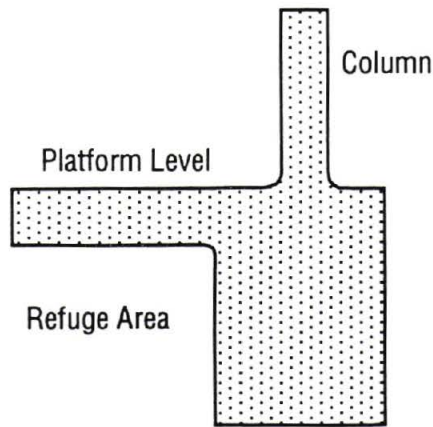
Upon completion of MOS-2A, there will be a total of eight (8) passenger stations in operation on the METRO RED LINE. Future plans include an expansion of the system and calls for added stations, to be specified later.

Station characteristics: Two levels, Mezzanine Level and the Platform Level.

- \* Provide transit connections, at the 7th/Metro Center for connection to the Blue Line.
- \* Serve major sources of ridership.

Escalators, stairs, and elevators will provide normal vertical circulation between surface, mezzanine, and platform levels of Red Line stations. Stations are equipped for both attended and unattended operation.

If someone should become trapped on the Right-of-Way at station locations, there is a refuge area directly under the platform overhang.



Sideview of Platform

Each of the stations have Fire Department Standpipe Connections located at each end of the platform, near the emergency exit stairways. In addition, most platforms have a standpipe located in the center of the platform, with some stations having two platform level standpipes.

If an emergency at a station should occur and evacuation is required, patrons may exit at stairways to street level or parking lot levels. In addition, emergency exits are located at each end of the platform, which will allow the patrons to exit the platform to street level.

There are seven crosspassages in MOS-2A located at approximately 800' intervals between Station. These crosspassages access the adjacent tunnel and are utilized to assist passengers in train evacuation involving Fire, Smoke or Gas emergencies. Four of these crosspassages also exit to street level. The diagram on page 27 specifies emergency exit locations at MOS-2A Stations crosspassages and their street exit locations.

In addition, exit signs in side station and at crosspassages that do not exit to street access will be **RED** in color. Exit signs that do exit to street level will be **GREEN** in color. This exit sign color coding system, is a recent change in policy and the existing Red Line System will be modified for adaptation.

Most stations have auxiliary rooms located in different locations which house electrical equipment which may include elevator/escalator system wiring and apparatus, signaling circuitry and traction power sources.

The Metro Red Line is designed to handle a maximum train length of six cars (three dependent pair). At this point and time, four car trains (two dependent pairs) will operate during all service periods. While the projected volume of passengers does not warrant a four car consist during all peak service periods, a two car train (one dependent pair) will be operated in off-peak hours.

Station amenities will include benches. Each station will have public telephones, passenger assistance intercoms, (P-Tels) and Emergency Intercoms, (E-Tels) direct to the CCTV monitors at the Rail Central Center.

At Union and Western terminals, crossovers will be used as a means of a train turn back. The normal method of train turn back will be via the crossover in front of the station. Train Control equipment will provide for automatic route selection to either platform side. Train Controllers will control route selection via SCADA.

If an abnormal operating condition is expected to interrupt Red Line service for an extended period of time, alternative bus service may be instituted. The Rail Controller will coordinate this action, called a "Bus Bridge," with the Bus Operation Control Center.

Some stations have adjacent parking facilities, Kiss and Ride areas, and/or bus pull-in areas to accommodate patrons arriving by automobile or by bus.

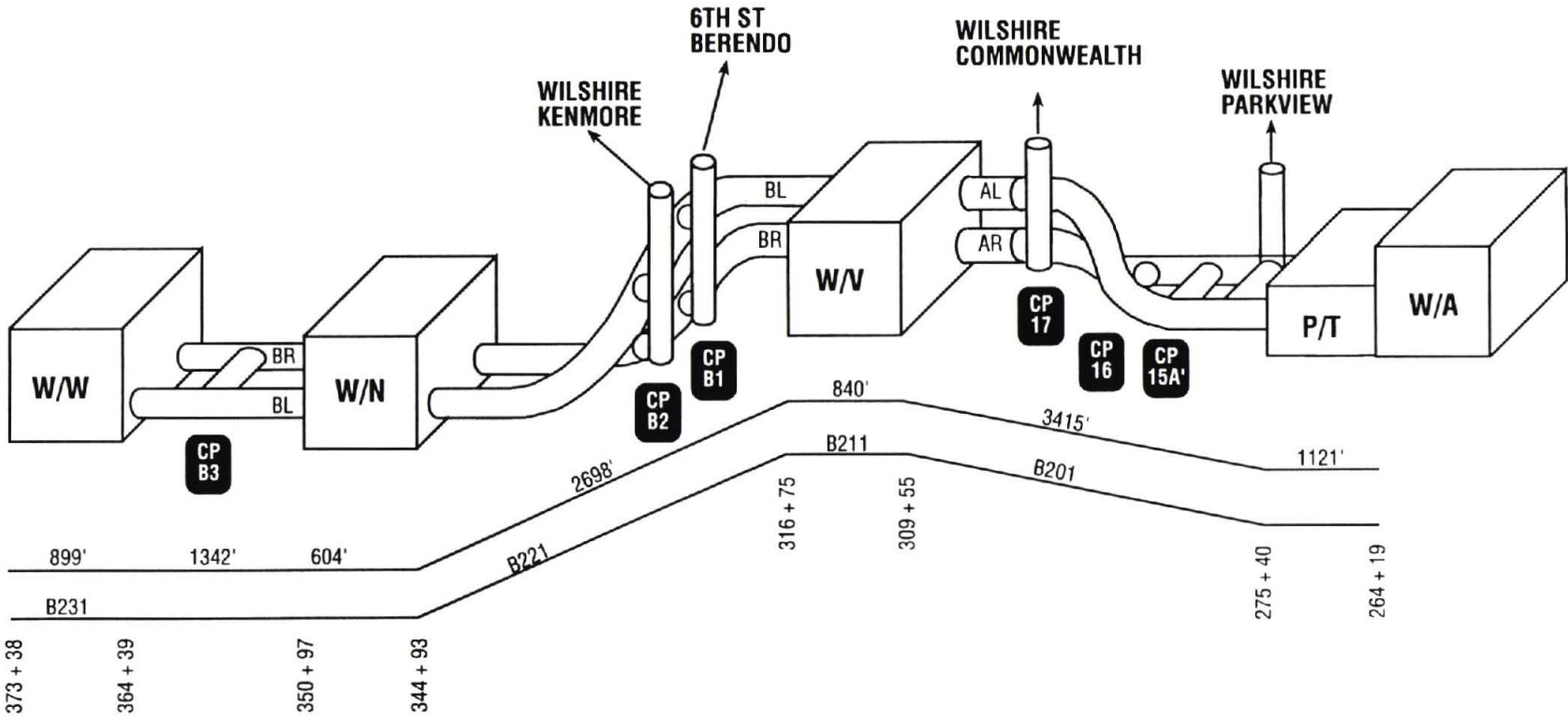
Restroom facilities are not provided, for security purposes.

Stations and associated equipment have been designed to function without a station agent on duty. Any necessary control of the station and/or contact with patrons will be accomplished by using closed circuit television (CCTV), public address equipment and other electronic monitoring systems.

Station facilities are equipped with a Public Address (PA) subsystem, for announcements to stations, vehicles, ancillary rooms, the Rail Control Center and the Main Yard. The PA subsystem can be controlled from the Rail Control Center, Emergency Management Panels (EMP), located at each station, command posts, at each station, and from the Main Yard.

# WILSHIRE CORRIDOR STATION & TUNNEL CONFIGURATION

27



# FARE COLLECTION FOR METRO RED LINE

Each station will have at least two Ticket Vending Machines. The TVM's are located in an area known as "Free Zones".

## How to Buy a Metro Red Line Ticket

### STEP 1 Select Fare

Regular Fare	Press Button	Cost of Fare:
One-Way		\$1.35
One-Way with Transfer to Bus or Rail		\$1.60
Round Trip (No Transfer Available)		\$2.70
Two (2) children (under age 5) may ride free with each adult.		
Senior/Disabled*	Press Two Buttons	Cost of Fare:
One-Way		\$0.45
Way with Transfer to Bus or Rail		\$0.55
Round Trip (No Transfer Available)		\$0.90

\*Medicare Card holders qualify.

### STEP 2 Insert Money/Tokens

### STEP 3 Take Ticket/Change from Loser tray

Your ticket is valid **one-way** until the printed expiration time. A **round-trip** ticket is valid for return to this station on date printed.

Persons on the platform or train must present a valid fare on request...failure to do so could result in a citation (Section 640 California Penal Code.)

## Para Comprar un Boleto para el Metro, Línea Roja

### PASO 1 Seleccione el Pasaje

Precio Regular	Oprima el boton	Precio del pasaje
En una dirección		\$1.35
En una dirección con boleto de trasbordo para autobús o ferrocarril		\$1.60
Ida y vuelta sin boleto de trasbordo		\$2.70
Dos niños, menores de 5 años, pueden viajar gratis con cada adulto.		
Mayores de edad/Incapacitados*	Oprima dos botones	Precio del pasaje:
En una dirección		\$0.45
En una dirección Con boleto de trasbordo para autobús o ferrocarril		\$0.55
Ida y vuelta sin boleto de trasbordo		\$0.90

\*Medicare Card holders qualify.

### PASO 2 Deposite el Dinero/Ficha

### PASO 3 Tome el Boleto y el Cambio de la Bandeja Inferior

El boleto de ida en una dirección es válido hasta la hora de vencimiento impresa en el mismo. El boleto de ida y vuelta es válido para regresar a esta estación en la fecha impresa en el mismo.

Los pasajeros deberán presentar un boleto válido en las plataformas o en los trenes. No tener boleto o prueba de pago puede resultar en una multa (Sección 640 del Código Penal de California).

The ticket vending system is a self-service, barrier free system. Passengers will not have to pass through any turnstiles or barriers, allowing for quick and easy boarding or egress.

The system is "user-friendly". The video display screen, as well as written instructions, informs passengers where to insert money and push buttons. The machines will print custom tickets for various destinations and make change.

Once patrons have bought tickets, patrons will wait in a specially marked "paid" area of the platform until their train arrives.

# HEAVY RAIL SECURITY

## GENERAL DESCRIPTION

Security on the Metro Red Line will work in conjunction with local agencies. Security will consist of uniformed and plain clothed Law Enforcement Officials assigned to the trains. Typical coverage includes officers patrolling the line in a marked patrol vehicle, riding trains throughout the system and requesting proof of fares. Ordinances are enforced by the issuance of a standard criminal citation which is processed through local Municipal Courts.

Additional Law Enforcement responsibilities include: preparing incident or arrest reports, issuance of parking citations and impounding vehicles, testifying in court when subpoenaed, assisting and providing information to the public, and ensuring the safety of passengers on the trains and in the stations.

Transit Police will circulate randomly, verifying that riders have paid their fare and issuing citations to those who have not paid.

A major concern involving all of our stations is the safety and security of our patrons, employees and equipment. The use of Closed Circuit Television will allow surveillance from the Central Control Facility. Patrols by Law Enforcement Agencies, along with LACMTA personnel (Supervisors, Operators and Facility Maintenance Personnel) will enhance security. These personnel will be in direct contact with the Central Control Facility.

## EMERGENCY SITUATIONS

Response to an emergency condition begins when an employee becomes aware of the condition and makes the necessary notification. The employee will contact the Central Control Facility and give as much information as possible regarding location, direction, the nature of the problem and remain on scene, giving periodic updates until a Rail Transit Operations Supervisor (RTOS) can arrive or the employee is released by the Central Control Facility.

The RTOS responsible for line supervision, and when necessary, implementing emergency response programs. Additionally, the RTOS will conduct special investigations of accidents, prepare follow-up reports and make safety recommendations, for LACMTA purposes.

The RTOS will act as the ON-SCENE COORDINATOR, (OSC), for outside Emergency Response Agencies. The OSC can be identified by a white vest with lettering identifying this individual as ON-SCENE COORDINATOR.

**NOTE:** *The RTOS functions are intended to assist the Incident Commander during an emergency situation. The knowledge and direct radio contact the RTOS has can be beneficial and increase safety of all personnel at the scene.*

The LACMTA considers the following as being incidents and/or accidents:

- Broken or faulty signals.
- Broken or faulty Control/SCADA indications.
- Broken or faulty wayside equipment.
- Broken or faulty vehicle equipment.
- Violations of instructions, train orders and/or bulletins.
- Collision of a train with a maintenance vehicle or alighting personnel from a train that requires medical attention.
- Mainline or Yard derailments.
- Any incident and/or accident that requires evacuation of personnel.
- Fire or explosion on a train or LACMTA facility or construction site.
- Collision between trains.
- Collision between trains and track or wayside equipment.



- Incidents and/or accidents involving a runaway train.
- Incidents and/or accidents involving Mainline Interlockings.
- Chemical spills or uncontrolled release of a compressed gas or hazardous materials.
- Any individual with an injury requiring medical treatment.
- Industrial injuries occurring at a LACMTA facility or construction site.
- Intrusions affecting any Rail Property.
- Death

After arriving at the scene, the RTOS will relay pertinent information between the responding teams and the Central Control Facility. In addition, an assessment of damage, injuries, condition of stations, the traction power system and tracks will be conveyed to the Central Control Facility while working with all response team members at the scene.

In any situation, once everyone is safe and anyone needing medical attention is attended to, the first priority of the RTOS is to restore normal train service. It is for this reason that the RTOS will ask that power be restored, if it has been removed, and that the tracks are cleared of all vehicles and/or equipment.

In all incidents/accidents, the OSC will work closely with outside Emergency Response Agencies, to give support and any information that may be needed. If one track can be cleared, it is a priority to get that track open so that train service can be restored. The RTOS will remain on scene until the incident scene is released by the appropriate Emergency Response Agency.

NOTE: Evacuation of passengers from the trains, except in a dire emergency, must be with the Rail Controllers approval. The RTOS will monitor and remain in constant radio contact with the Central Control Facility at all times.

Actual rescue of victims is the responsibility of the local Fire Department. On occasion, however, they may require assistance from transit system personnel or equipment. This assistance shall be provided as requested.

It is recognized that certain operations, such as jacking train cars and removing pinned victims require specialized equipment and should only be done by trained LACMTA personnel. Effective liaison between the Fire and/or Law Enforcement personnel in charge and the Accident Investigation Team is vital to avoid situations which may further endanger personnel or result in excessive damage to equipment.

The Rail Accident Investigation Team for LACMTA is comprised of:

- On-Scene Coordinator
- Rail Operations Manager
- Vehicle Maintenance
- Facility Maintenance
- Rail Safety
- Risk Management

To help address any problems that might occur, emergency scenarios will be set up in the near future. All agencies that might be affected by an emergency will be asked to attend. The next page reflects potential emergencies, indicating types of scenarios that will be conducted.

Safety training classes are on-going and arrangements can be made for any interested parties to attend.

## **EMERGENCY MANAGEMENT PANELS (EMP's)**

All stations on the Metro Red Line will have Emergency Management Panels (EMP's) which Fire Services will have access to. Equipped inside will be an Emergency Trip Station (ETS), Public Address System, a button to activate a pre-recorded public address announcement which activates an electronic message board giving evacuation instruction to patrons at the station. Telephones will provide direct communications to the Central Control Facility. In addition, controls to the elevators and escalators are located within the EMP. During emergency situations, emergency fan configurations in fan or exhaust mode can be controlled manually from the EMP. Methods of entry into the EMP will be covered with Emergency Response Agencies at a later date.

Fire Department connections and fire sprinkler systems are provided in many locations. As built drawings will be provided later for all Fire Departments to identify the locations of these connections and sprinkler systems. All Departments are invited to do Pre-Planning visits to all facilities. All visits are to be coordinated with the Central Control Facility prior and upon arrival to any facilities.

## **UPCOMING EMERGENCY SCENARIOS**

- Bomb Threat
- Hostage Situation
- Fire/Smoke on board a train
- Disabled Train/Single Tracking
- Accidental Uncoupling
- Person hit by train
- Derailment/Collision
- Fires at Substation
- Evacuations
- Earthquake Loss of Power/System Evacuation
- Loss of Power CCF Requiring Local Control of Operations
- Train Fire in Tunnel
- Hazardous Material Spill
- Natural Gas Smell

## **IMPORTANT ADDRESSES/PHONE NUMBERS**

### **Rail Central Control Facility**

2000 East Imperial Highway  
Los Angeles, CA 90059

### **Central Control Manager**

(213) 563-5026

### **Red Line Controller**

(213) 563-5290

### **Metro Red Line Yard**

320 South Santa Fe. Av  
Los Angeles CA 90013

### **Red Line Start-up Operations Manager**

(213) 972-3232

### **Red Line Secretary**

(213) 972-3222  
(213) 972-3219 (Fax)

### **Red Line Yard Control**

(213) 972-3200  
(213) 972-3205 (Fax)

### **Instruction Department**

(213) 972-3240

### **Test Control**

(213) 383-3606  
FAX (213) 383-3830

**Red Line Vehicle Maintenance Manager**

(213) 972-3304

**Red Line Vehicle Maintenance Supervisors**

(213) 972-3304

**Rail Safety Department**

One Gateway Plaza  
Los Angeles, CA 90012  
(213) 972-4965

**Rail Facility Maintenance**

320 South Santa Fe. Av  
Los Angeles CA 90013  
(213) 972-3279

**LACMTA News Bureau**

One Gateway Plaza  
Los Angeles, CA 90012  
(213) 922-2700

## DEFINITIONS

### **ASPECT -**

The appearance of a Wayside Signal (wayside or hand) that provides an indication viewed from the direction of an approaching train.

### **AUTOMATIC TRAIN CONTROL (ATC) -**

The complete, automated, train control system comprised of ATO, ATP and ATS.

### **AUTOMATIC TRAIN OPERATION (ATO) -**

A subsystem within ATC which automatically regulates train speed, performs programmed station stopping and is subordinate to ATP.

### **AUTOMATIC TRAIN PROTECTION (ATP) -**

A system maintaining safe Train Operation through a combination of Train Detection, Train Separation, and Regulation.

### **AUTOMATIC TRAIN SUPERVISION (ATS) -**

A subsystem within ATC to monitor train operation and maintain traffic patterns. ATS is subordinate to ATP.

### **BALLAST -**

Selected material (rocks) placed on the rail roadbed for the purpose of holding the track in line.

### **BLUE FLAG -**

A portable blue flag, light or marker placed at both ends of a rail vehicle as an indication that personnel are working on, under or about the vehicle(s).

### **BLUE LIGHT STATION-(BLS) -**

Designated locations of the Emergency Trip Stations (box enclosures), where the PUSH BUTTON device, when activated, DE-ENERGIZES Traction power to each designated track section within the limits of the power feed. Additionally, the BLS houses an emergency telephone, fire telephone, and if in a station, the DELUGE SYSTEM Activation Controls (water sparing system).

### **BRAKE, DYNAMIC -**

The primary braking system in which electric current, derived from the motors, acting as a generator, provides controlled braking.

### **BRAKE, EMERGENCY -**

The maximum braking that can be obtained, but once activated cannot be released until the train has come to a complete stop.

**BRAKE, FRICTION -**

Controlled, air-blended systems applying stopping forces to brake discs on each axle.

**BRAKING (FULL SERVICE) -**

The maximum braking that can be obtained without going into an emergency stop condition.

**CAB -**

The operating compartment of a rail vehicle from which control of the vehicle is achieved.

**CAB SIGNAL TERRITORY -**

That part of the mainline where cab signals govern train movement and speed.

**CAR MOVER -**

A self powered auxiliary vehicle used to move a disabled vehicle, or move a vehicle in a de-energized territory.

**CONTACT RAIL -**

The electrical conductor ( adjacent to running rail) which provides the 750-volts direct current to the vehicle through contact with the current collectors (shoes) on the vehicle.

**CONTACT RAIL SIDE APPROACH-**

A mounted extension of the contact rail alongside the running rail which provides a method for lifting the vehicle collector shoe onto the contact rail and providing uninterrupted traction power to the vehicle for continued rail vehicle movement.

**CHOCK, WHEEL -**

A device placed under a rail vehicle between the top of the rail and the rail vehicle wheel to prevent vehicle movement when brakes are not applied or are defective.

**CONSIST -**

The number and specific identity of the cars that make up a train.

**COUPLE -**

To connect rail vehicle units in order to permit the resulting consist to be operated from one cab.

**COUPLER -**

A device for mechanical, electrical and pneumatic joining of rail vehicles and/or trainline control functions.

**CROSSOVER -**

Switches and track so arranged to provide a route from one track to another.



**DEADMAN CONTROL -**

A device built within the manual controller on the vehicle operating console which must be held in the operating position before any vehicle movement can occur.

**DE-ENERGIZE -**

To shut off electrical power.

**DERAILMENT -**

When a train or car wheel leaves the rails.

**DIVERGING ROUTE -**

A change in a train's directional movement over a reverse track switch to allow for crossover movement, train storage, reversing direction or other purposes.

**EMERGENCY TRIP STATION (ETS) -**

A push button device, located within an orange box, at blue light designated locations that, when activated, de-energizes traction power to each designated track section within the limits of the power feed. Additionally, the ETS houses an emergency telephone, and a hook-up for a fire telephone.

**ENERGIZE -**

To turn on power.

**ENERGIZED, EQUIPMENT -**

Electrical apparatus, wires, cables, switches and motors which are connected to an electrical power source and are considered "live".

**FLAG -**

A device used for relaying hand signals or to indicate conditions on the right-of-way. A flag may be made of cloth, metal or other suitable material, or may be a light during hours of darkness.

**FLAGGER -**

A person designated to protect a work party and/or their equipment on the mainline.

**FLAGGING PROTECTION -**

Flags and lanterns used by work crews for protection while working on or about the track.

**GRADE CROSSING -**

A crossing over the rail at rail level used for a roadway or footpath.

**GAP SECTION -**

A break or distance between contact rail section, which can be bridged by the collector shoes of the lead and rear trucks of a car.

**GAP**

(Non-Bridgeable) - Gaps in the contact rail that are longer than the distance between the front and rear collector shoe on the trucks of a single passenger vehicle.

**HI-RAIL EQUIPMENT -**

Tire mounted, rail vehicles equipped with flanged steel rail wheels that allow the equipment to be operated either on the rail or a roadway.

**INCIDENT COMMANDER -**

An individual of the emergency response agency, who's duties consist of establishing a Command Post and is assisted by the On-Scene Coordinator.

**INDICATION -**

The information conveyed by the aspect from a fixed signal, a cab signal, or a hand signal as viewed by a Train Operator.

**INTERLOCKING -**

An arrangement of signals, switches, track and control apparatus so interconnected that functions must succeed each other in a predetermined sequence, thus permitting train movements over routes only if nonconflicting conditions exists.

**HEAVY RAIL VEHICLE (HRV) -**

An electrically self-propelled, which could be a passenger vehicle (car), hi-rail equipment or other truck and track equipment.

**MAINLINE -**

The territory controlled by the Test Controller consisting of: main tracks; Interlockings; turnbacks tracks; controlled sidings; tail tracks and yard leads.

**MAIN TRACK -**

The designated direct fixed track surface on the Mainline upon which trains are operated by cab signals, fixed signal or both when authorized by the Test Controller, in a manner prescribed by the rule.

**MANUAL CONTROLLER -**

The control handle that allows the Train Operator to manually control the operation of the train, through acceleration and braking.

**NO CLEARANCE-**

A location within the Metro Rail System where no clearance exists between fixed wayside structures/appliances and a moving vehicle operating on the track structure.

**NOTICES-(procedure) -**

Procedure notices will advise the Test Operating Personnel on the procedure to be followed in a particular circumstance. All notices will be numbered consecutively from January 1 of each year.

**PERFORMANCE LEVEL -**

One of the series of command from ATS to Automatic Speed Regulation (ASR), used to modify acceleration and ATP speed limits only when ATP speed is above 25 M.P.H., to achieve a desired traffic pattern.

1. PL - 1: 100 percent ATP speed limit and 100 percent acceleration.
2. PL - 2: 85 Percent ATP speed limit and 100 percent acceleration.
3. PL - 3: 85 percent ATP speed limit and acceleration limited to 2.4 mi/hr/sec, which is 80% acceleration.
4. PL - 4: 75 Percent ATP speed limit and acceleration limited to 2.4 mi/hr/sec, which is 80% acceleration.
5. PL - 5: 50 percent ATP speed limit and acceleration limited to 1.5 mi/hr/sec, which is 50% acceleration

**POCKET TRACK -**

A designated track, auxiliary to the mainline track, used for storage, transfer of cars between rail line, or other purposes.

**PORTAL -**

The entry and exit point of a tunnel.

**POSTED SPEED -**

The maximum allowable speed over a section of track authorized by fixed signal, temporary signal or rules.

**Power Clearance -**

Form which when completed records the energized or de-energized status of traction power apparatus, i.e. breakers and grounding straps.

**Power Permit -**

Form which when properly completed authorized qualified employees to perform work on energized circuits, apparatus or control devices without jeopardizing personal safety or property.

**POWER (TRACTION) SYSTEM -**

The substations, feeder cable, contact wire, running rails, switchgear and other equipment interfacing with public utilities or other power sources for the movement of trains and their supporting auxiliary systems.

**RAIL VEHICLE -**

A self propelled vehicle operating on tracks, which could be a light rail vehicle (LRV), hi-rail equipment or other truck and track equipment.

**RED TAG -**

A two-part, red identification tag issued by the Test Controller to designated construction, testing or maintenance personnel that have been approved in the Track Allocation Meeting to work in an area where the contact rail will NOT be energized and train operations will not be conducted while the Red Tag is in their possession. Test Controller will give the individuals one half of the Red Tag and keep the other half. Not until all Red Tags are returned to the Test Controller will traction power be restored or reassignment of the red tags be permitted by the Test Controller.

**RED TAG AREA -**

The limits of the Red Tag area may change weekly during Track Allocation Meeting every Thursday, the Track Allocation Coordinator will define the limits of the Red Tag area for the following week.

**RED TAG DESK -**

The desk where Red Tags are distributed and returned. The Red Tag Coordinator is located at the Red Tag Desk.

**RESCUE TRAIN -**

Rail equipment used to retrieve disabled rail vehicles or stranded passengers.

**R.T.O.S. -**

Rail Transit Operations Supervisor.

**SECTIONALIZING -**

De-energizing a specific section of track area for work or other purpose.

**SIGNAL -**

A method of conveying a visual message to the Train Operator concerning conditions affecting train movement. The signal as viewed by the Train Operator is the "aspect". The information conveyed by the "aspect" is the signal's "indication".

**SINGLE TRACK OPERATION -**

The operation, within defined limits, of trains operating in both directions over a single track on the mainline.

**SLIP/SLIDE SYSTEM -**

An onboard protection system for detecting wheel slip on rail cars that prevents the rail car wheels from locking.

**SLOW ZONE -**

An area of defined limits in which train speed is reduced for track work or other purposes.

**SPEED, RESTRICTED -**

The operating speed that will permit stopping a train, within one half the range of vision of the Train Operator, short of an improperly lined switch, track defect, train, rail vehicle or any other obstruction. Restricted speed shall not exceed 15 mph.

**SUBSTATION -**

A facility for distributing electricity identified by an exterior blue light.

**SWEEP TRAIN -**

The first train to operate over the mainline each day or after an interruption of service, operating on sight, prepared to stop within one half the range of vision of the Train Operator.

**SWITCH -**

A device enabling rail vehicle movement from one track to another.

There are two types:

1. Remote-controlled - Operated from a distant panel or track impulse
2. Manual- Operated by hand.

**TC&C -**

Train Control and Communication Room.

**TERMINAL STATION -**

The station located at each end of the rail system where turn-back operations are normally made.

**TEST CONTROLLER -**

The designated employee on duty at the Test Control Facility with absolute authority over all movements on or affecting the Segment 2A Mainline.

**TEST COORDINATOR -**

Designated employee responsible for conducting test.

**TEST CONTROL FACILITY -**

The location where all Segment-2A Mainline operations are authorized, directed, and controlled.

**TRACK ALLOCATION -**

A published weekly summary that indicates the specific Contractors, maintenance testing personnel that will be scheduled to work in the Red Tag Area the following week. It indicates the limits, time, and days of the week for these activities.

**TRAIN -**

One or more rail vehicles combined into an operating unit, with headlights displayed to the front and taillights/marker lights to the rear.

**TRAIN OPERATOR -**

The employee having direct control and responsibility for the safe movement of the rail vehicle.

**TRAINLINE -**

Electrical and pneumatic functions routed through and between cars by means of couplers so that signals may be transmitted to all cars of the train.

**TRAIN STOP -**

Electrically operated mechanical device that prevents unauthorized train movement beyond its location to ensure observance of restricted signal indication.

**TRIP STOP -**

Mechanical device placed on a running rail which stops a train by activating braking systems.

**TRUCK -**

The underframe containing the wheels, motors and braking components of the rail vehicle.

**WORK TRAIN -**

Non-revenue service train used to assist in on-track maintenance or for other purposes.

**YARD CONTROLLER -**

The designated employee on duty at the division yard with absolute authority over all movements within the yard.

HE 4491 .R42 F326

20817

Los Angeles County  
Metropolitan Transportation

DUE DATE	DUE DATE

REFERENCE ONLY

**MTA LIBRARY**



100000169290

